COAL AGE

Vol. 5. NEW YORK, JUNE 6, 1914 No. 23

The Wonderful Dream

By Berton Braley

Written expressly for Coal Age

WEARY with project and plan and scheme
The Manager slept and dreamed a dream
Of a noble Stranger who bade him, "Come,
And I'll show you a mine that is GOING SOME!"
So away they flew through the ambient air
Till they came to a spot exceeding fair,
And there they gazed on a handsome mine
Where everything seemed to gleam and shine,
Where hoist, compressor and breaker too
Were big and busy and neat and new,
And all the workers, with smiling faces,
Were doing their best in their proper places.

Into the deep shaft's yawning crater
They dropped in a cage like an elevator,
And through the whole mine's great extent
The Manager and the Stranger went.

THE air was bracing and pure and cool,
There wasn't a sign of a horse or mule,
(Electric motors performed the work
Which they had done in the dark and murk)
Each miner toiled with a right good will,
His cars stood ready for him to fill,
There was no hurry, no heat and haste,
No useless waiting, no fret, no waste,
The miners toiled with a skill most deft
And when they were through there was no coal left.
The guide explained as they went their way
That the miners lived to be old and gray
And died at ninety or more, he said,
With the sorrowing family round the bed!

He added, "this is a fact, I vow,
"There's never a strike or a labor row!"
The Manager wiped his throbbing brow,
"Say, where is this mine?" he loudly cried,
"In Heaven, of course" returned the Guide!

THE Manager woke and from bed he sprung
For the telephone bell had loudly rung,
He put the instrument to his ear,
And this is the message he had to hear,
"Hello, hello! The pumps are clogged,
The lower workings are water-logged,
And the hoist is broke and the fan won't go,
And the breaker's stopped—'cause the steam's too low,
And the shaft is filling with mud and muck,
And—hey, hello there! The men have struck!"

What Is to Become of the Anthracite Coal Industry?

By Eli T. Conner*

SYNOPSIS—Some interesting history concerning coal mining in the anthracite fields of Pennsylvania Conditions prior to present agreements and causes that led up to understandings between the big railroad interests. Labor troubles in 1900 and 1902 and adoption of sliding wage scales. If the railroads must part with their coal holdings, it is suggested that the industry be governed by a board of commissioners.

The dissolution of trusts or supposed trusts controlling many important lines of business, which state and national laws or legislators demand, naturally prompts the question: What is to be done with the pieces when a long established enterprise is broken up? Should the persistent efforts to disrupt the so called "Anthracite Coal Trust" prove successful, and the present owners of over 90 per cent. of the mines and lands in that region, the railroad companies, be compelled to relinquish their coal holdings, how shall the anthracite business be conducted?

The present owners, who are struggling to maintain a position that has taken years to attain, together with untold millions of dollars capital, could hardly be expected at the present time to consider any plans under such an eventuality, but it seems to me that the effects of such dissolution, should it take place, ought to be pointed out, in the public interest, as well as for the protection of the invested capital, and the interests of the employees; and that the coal remaining shall be conserved to the utmost possible extent.

Causes That Led Up to the Present System

Intelligent consideration of this important subject can only be given in the light of the past experiences in the anthracite region. It is, therefore, necessary to review as briefly as possible, the history of the development of the industry and the causes that led up to the system that now prevails.

Aside from the question of freight rates on coal, which has no part in this discussion, a correct understanding of the conditions will reveal that great benefits to all interested, including the general public, have followed the inauguration of the present regime.

The advocates of a return to "the good old times of unrestrained competition," should recall its baleful effects upon all kinds of industry, individual employees and property, during the three decades from 1865 to 1895.

It only requires consideration of one prime instance to illustrate the point desired—the transportation system. During the period mentioned, the fiercest and most unscrupulous competition in rates, rebates, and every other form of warfare known to experts of that destructive period, was the rule, resulting in wrecks of system after system, with receiverships and re-organizations with their attendant waste of resources; the physical deterioration of property, and the destruction of the equities of security holders.

*Consulting engineer, Stephen Girard Bldg., Philadelphia, Penn.

This competition, aided sometimes by the assent of state authorities, was the main reason for the abandonment and destruction of the systems of inland waterways and canals. Canals were said to be out of date, and truly, were unprofitable, but it is now fully recognized that it was a serious mistake to destroy the improvements that had been so popular and useful during the first half of the 19th century.

What happened in transportation affairs was duplicated in nearly all other lines of industry, and particularly was this the case in the production and marketing of anthracite coal, which is the subject of this paper.

Inefficiency in Mining Irreparable Waste

The effects of the chaotic conditions in transportation affairs were serious, though not irreparable; but in mines, it is quite a different thing, for here, unless the highest grades of efficiency and care are constantly exercised, great and irreparable waste of an incomparable natural resource results.

It will be interesting to trace the history of the anthracite industry from 1865; after the artificial stimulation of the war period, until 1895, when the lowest depths of despair were plumbed by those whose capital and interests were involved. During this period, when the annual output of anthracite coal increased from about ten million tons to forty-six and one-half million tons, almost unrestricted competition in every department of the industry, but particularly in the market, prevailed.

Efforts were made at various times by many interests to arrive at uniformity in operating methods and market prices, but these attempts nearly always failed.

Most of the mines developed prior to 1871 were owned by individual operators, the conspicuous exceptions to this rule being the Delaware & Hudson Canal Co., the D., L. & W. R.R. Co., the Pennsylvania Coal Co., and the Lehigh Coal & Navigation Co.

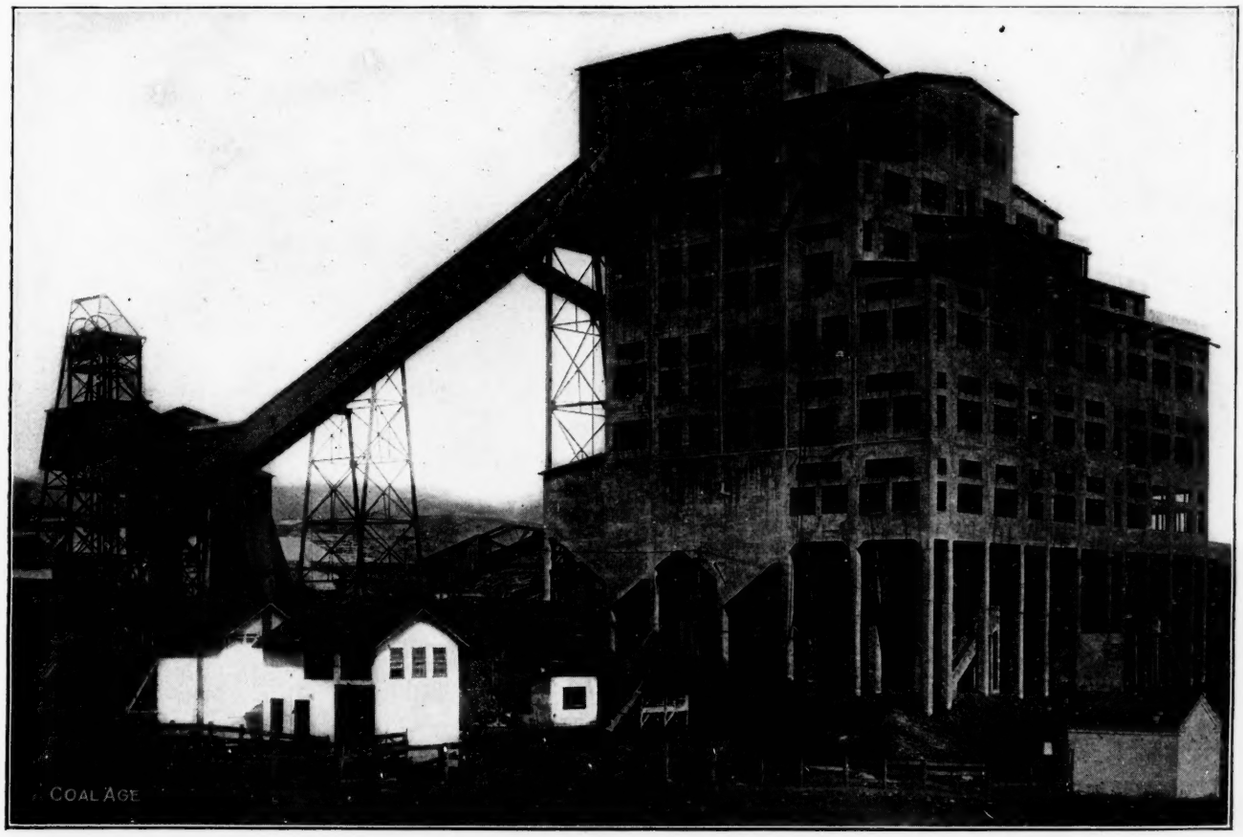
The demoralization was so great during much of this period and the failures of operations so frequent, that it was almost impossible to interest capital in such a hazardous business; but meantime the great value of anthracite coal as the ideal domestic fuel, as well as its value as natural coke for the manufacture of pig iron, was more and more appreciated by the consuming public, as indicated by the steady annual increase in production. The growing inability of individual operators to continue the fight for exstence, partly due to the fact that the cheaply mined coal above water level was exhausted, but more to the fierce competition in the markets which reduced the prices realized below the profit line, coupled with the imperative necessity to assure all the coal for transportation that was possible, practically forced upon the railroad companies the necessity to buy and operate coal mines themselves.

All of the railroads serving the anthracite region from the early days of its exploitation had been more or less intimately connected with the mining industry, but about 1871 the Phila. and Reading R.R. Co. adopted the policy

of buying nearly everything in the way of operating collieries and undeveloped coal lands naturally tributary to its lines.

This action by the Reading R.R. was stimulated by the invasion of its territory by the Pennsylvania and the Lehigh Valley roads, all striving to assure their position in the transportation of this profitable freight. This enabled many individual operators who had been on the verge of bankruptcy to get back part of their capital, and others to reap considerable profit, but it transferred the burden to other capitalists, who were unable to carry it, as instanced the years when the Reading R.R. was in receivers' hands, the Central R.R., of N. J., receiverships, the many years when the Lehigh Valley R.R. failed to earn dividends, and others that need not be mentioned.

The individual operator in most cases held his property under lease for a term of years, the minimum term, usually being 15 years and the maximum 30 years. These leases always provide that a certain rate of royalty per ton of coal sold shall be paid to the landlord, and that a minimum amount shall be paid, whether any coal is sold or not. Generally, the minimum clause is not particularly burdensome, but in times of dull business or shortage of railroad cars, or when production is curtailed for other reasons, the advance payments on this account mount up to considerable sums, and are a serious drain on working capital, when the margin of profit is as small as it was during a large part of the period under consideration.



TAYLOR BREAKER OF D. L. & W. R.R. CO., TAYLOR, PENN.

COMPETITION WAS DISASTROUS

The effects of the fierce competition in the anthracite industry were most severe in the Southern or Schuylkill field, on account of the greater cost of production due to the excessive contortion of the coal measures, and the generally steep pitches prevailing, and also to the softness and friability of the coal, resulting in a smaller yield of domestic sizes; as compared with the northern field, where the measures are generally flat or on gentle pitches, and the coal is of a strong tough nature. By reason of these natural advantages, the growth of the industry in the northern field was very rapid and operations there have generally been more successful than in the southern region, consequently individual operators were able to hang on longer here than elsewhere.

The necessity to mine enough coal to meet the minimum requirements of leases was a contributing cause of the unbusinesslike policy so long prevailing in the marketing of anthracite coal.

PURCHASE OF MINES BY RAILROADS DID NOT CORRECT GREATEST EVIL

The acquisition by the railroad companies of most of the mines did not correct the greatest evil of the industry—unreasonable competition, resulting in unremunerative prices for the product, because for years each transportation interest was struggling to increase the amount annually hauled to market, in order to be able to claim a larger percentage of the output of the whole region, and thus the market was generally glutted, with the inevitable result that the buyer dictated the price. During this period of chaotic mismanagement, it was no un-

usual thing to see large blocks of prime anthracite coal sold at tidewater points at auction, the prices realized sometimes being but little above the freight.

It was the custom for the general sales agents to meet occasionally, ostensibly to exchange views for the mutual benefit of their respective companies, and the advancement of the industry, but the general result of these meetings was that many of those making the usual "gentleman's agreement," immediately tried to take advantage of his fellows to book all the business possible, not by the superiority of his salesmanship, but by cutting prices.

If such foolish and improvident practices as have been described had resulted only in the financial loss to those engaged in the warfare, it would not have been so serious; it would have been only a question of the length of the pocketbooks of the combatants; but this is the least of the damage.

In order to keep the cost of production down to the lowest possible figure, the operators were compelled to resort to measures that were a disgrace to intelligent mining men. Thus, they developed only the thickest beds of coal, and frequently extracted only the bright clear glassy coal, leaving benches of equally as good fuel, and thinner beds, oftentimes in such condition that the coal was hopelessly lost for all time.

These reprehensible practices were not through ignorance upon the part of the owners and managers, because a majority of the original stock of coal-mining men came from England, Scotland and Wales where, speaking generally, methods of mining prevail that result in the maximum yield of coal from each acre of land. The late Jos. S. Harris estimated the average marketable yield in the anthracite region as 33⅓ per cent. of the original content. This has since been increased in various ways, but the loss of good coal is still very large.

Destructive Mining Methods

These destructive methods were only tolerated as a matter of grim necessity, because everybody else was doing it, and each mining company in order to live at all must of necessity follow suit. This intolerable waste of such an invaluable resource was fully recognized by all far-sighted mining men, and great and commendable efforts were made to correct it, but with very indifferent success.

It was appreciated that the situation and conditions surrounding the anthracite coal industry of Pennsylvania made it almost imperative, in order to correct the known errors in mining and marketing methods, and to properly conserve the remaining coal, to bring about in some way a combination of the many divergent interests; in other words, to effect what nature evidently intended, a harmonious unity of the whole region.

The first genuine effort in this direction was made by A. A. McLeod, president of the P. & R. R.R., in 1892-3, when he succeeded in leasing the C. R.R. of N.J., and the Lehigh Valley R.R. He also brought out what was known as the 60 per cent. contract, which was offered to, and accepted by most of the individual operators. This contract provided that the railroad company or its subsidiary coal company would buy the output of the individual operator's mine, paying therefore 60 per cent. of the price realized for the sale of the coal at tidewater points. The immediate result of the measures instituted by McLeod was a steadying effect in the market. Anthracite coal for a time ceased to be a football, at the mercy of anybody who felt like kicking it, and became a stable article of commerce at a fair price to the consumer and a reasonable profit to the producer. Unfortunately, for the proper conservation of the coal in the ground and for the operator who had his money invested, the McLeod system did not last long, as he was ousted in 1894 and the old methods of cutthroat competion again prevailed, so that the year 1895 was the most disastrous in the history of the industry.

Employees Were Made to Suffer

The operator was not by any means the only sufferer by reason of the conditions described. The employees were made to bear their share of the general distress, and in some instances, more than their share. The old Workingman's Benevolent Association, known as the W. B. A. which had helped the miners for a time to extort reasonable wages from the employers, broke up on account of internal dissensions in 1875, and for a long period the employees were unable to organize for their mutual protection. During the life of the W. B. A., most of the employees of the whole anthracite region were organized, which forced the operators to come together for mutual defense.

The operators' organization was inharmonious and less effective than it should have been; the northern members, particularly those in the Lackawanna region, breaking away from the other members and making agreements with the organized miners that could not be accepted by the southern operators, on account of the widely different natural conditions.

Many of the working methods adopted during the life of the W. B. A. became standard, and governed the compensation of employees after the disruption of the union. The most important of these was what was known as the "sliding scale" which provided that the rates of wages paid should be a certain percentage of the prices realized at tidewater. This system was in vogue in the southern field and to some extent in the Lehigh region, but not in the northern field.

Employers Took Unfair Advantage

The disbandonment of the W. B. A. left the employees at the mercy of the employers with the usual result of unrestrained power in the hands of any body of owners. In order to cut down the operating costs, many unfair advantages were taken of the mine workers. This was made easier by the large influx of laborers from Hungary and other countries of southern Europe, which began about 1881 and continued until the whole complexion of the operating force at most of the mines was changed, so that by 1895-98, 50 to 60 per cent. of the mine employees were of this class.

It is not fair to call these immigrants ignorant and undesirable acquisitions, as most of them were young and vigorous workmen and many of them could read and write in their own language. The fact that they knew no English, and that they came from countries where laborers' compensation is pitifully small, was taken advantage of by the anthracite operators, and in many cases they were paid less than standard wages, and used to break down the average that had been established by years of effort, and by numerous strikes and lockouts.

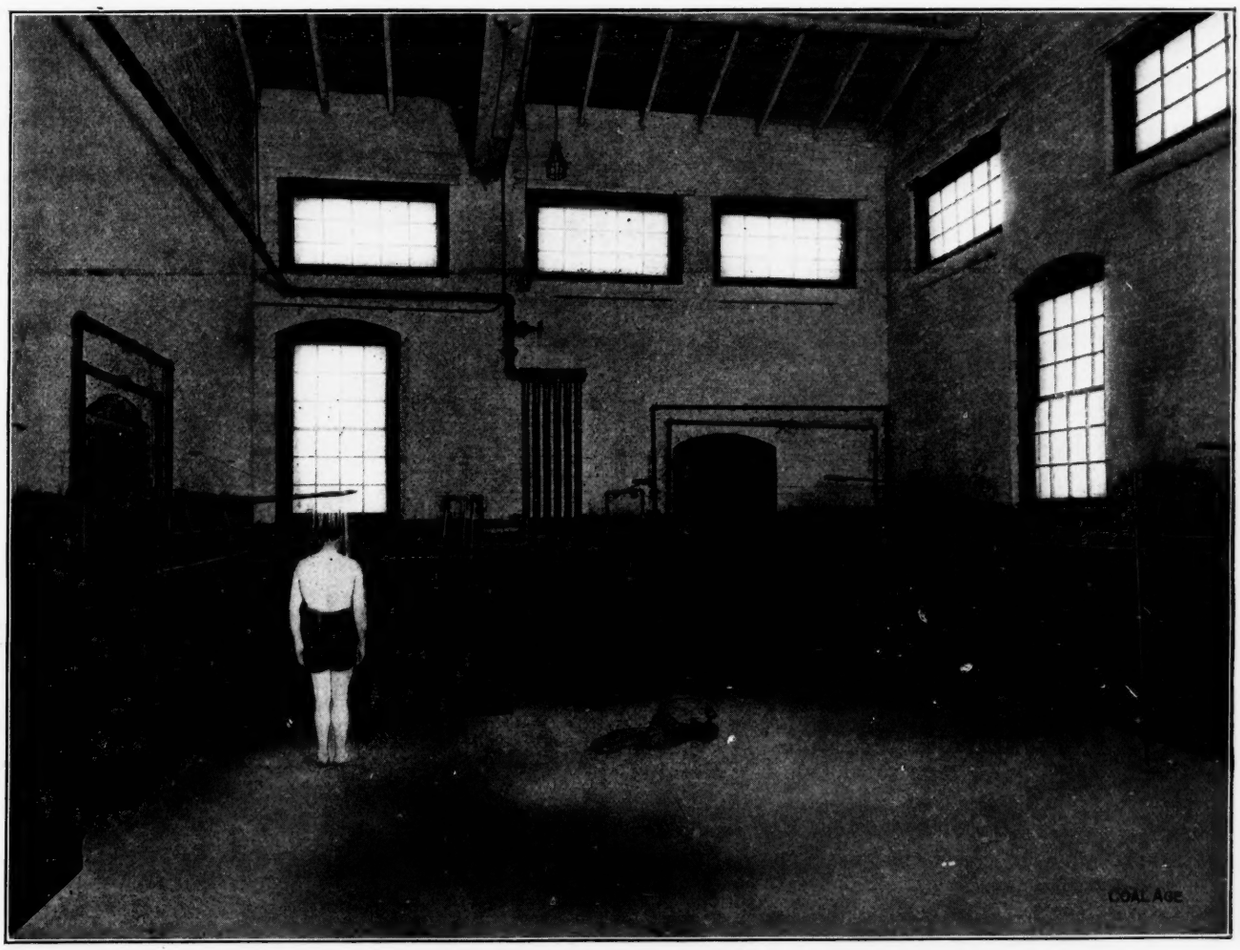
Another iniquity that was enforced by the operators, because they had the power, was in compelling the miners to purchase from the company powder and other mine supplies at exorbitant profits—powder that cost the operator $1.00 per 25-lb. keg was sold to the miner at $2.25 to $2.75 per keg. The individual operators also reaped large profits from their company stores; in many instances, compelling the employees to patronize these "pluck me" institutions, under penalty of losing their jobs, and as there was usually a plentiful supply of labor it was a serious matter for a man to be discharged. The company store abuse and the extortionate prices for powder and supplies have long since been corrected.

The powder extortion was enforced in the northern and Lehigh regions, but in the southern field, where the P. & R. Coal & Iron Co. is the dominant factor, it was sold at a moderate profit. This company also deserves credit for a generally more strict observance of agreements than many others.

The disastrous year of 1895 and the remembrance of the satisfactory conditions prevailing during the McLeod regime brought home forcibly to all mining companies the absolute necessity of some kind of combination or community of interest. Efforts were made in this direction, but were frustrated by the usual jealousies between the railroad-owned mining companies, generally called the "Big Companies." The individual operators were always at a disadvantage in competition with the big companies, who could afford to produce coal at a loss and depend upon the freight profit to even up, while the individual must earn enough during the life of his lease to repay his capital outlay, and as much more as possible to make his profit.

Independent Operators Combine

In the hopes of improving their condition, a majority of the individual operators, controlling a substantial tonnage, formed a corporation for the purpose of building their own railroad from the northern coal field to tide water. A route was selected, surveys made, and they even bought a large consignment of steel rails. This movement was headed by an aggressive and successful firm in the northern field who operated six or seven collieries of large capacity. The aggressive tactics of the individual operators' association and the threatened further competition in transportation of anthracite coal alarmed the financial backers of the several railroad companies, and overtures were made which, it is said, contemplated the purchase by the combined railroad companies of nearly all of the individual holdings. The result of this offer was the sale of the Simpson & Watkins Collieries to a corporation known as the Temple Iron Co. This concern was backed by five of the anthracite railroad companies. This sale stopped the construction of the inde-



Showers in Miners' Wash House, Storrs Mine of D., L. & W. R.R. Co.

pendent railroad, and the Temple Iron Co. has ever since been regarded as the instrument through which the "coal trust" has controlled the business.

The directors of the Temple Iron Co. were the presidents of several of the principal anthracite railroads. This sale broke up the individual operators' association, but as there were still some resourceful and successful operators whose properties had not been absorbed by the so-called trust, the business was by no means a monopoly. The Pennsylvania Coal Co. owned valuable mines and 70 miles of railroad, known as the Erie & Wyoming Valley R.R., from the mines to a connection with the Erie R.R. at Hawley. This company, together with the late Edw. L. Fuller, of Scranton, at that time controlling the Seneca Coal Co., and others, obtained an option on the abandoned Delaware & Hudson Canal from Honesdale to Rondout, on the Hudson River. It was proposed extending the E. & W. V. R.R. to the Hudson by building on the old canal site.

This threatened invasion of the transportation field by another competitor forced the financial interests to buy the Pennsylvania Coal Co., and its railroad, for the enormous sum of $27,000,000, and turn it over to the Erie R.R. for about $30,000,000.

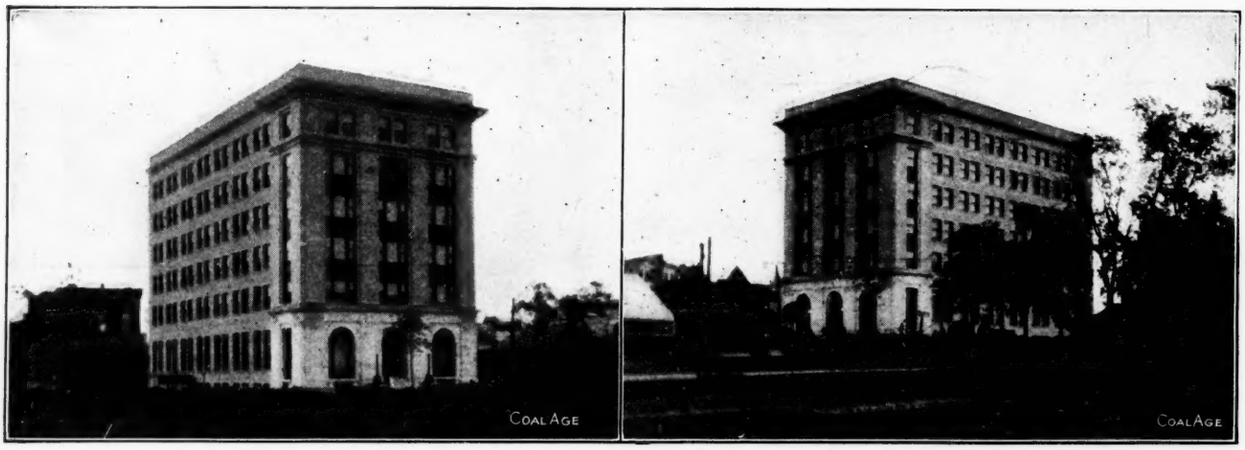
Gradually other individual holdings were bought in by the railroad companies, between 1895 and 1900. Many complaints were made by the mine employees relative to their wages, and occasional local strikes were inaugurated, but as the men had no organization, no substantial concessions were made.

Labor Troubles Commence

In 1897 the dissatisfaction became so great in the Lehigh region that striking employees at Audenried and McAdoo marched in a large body to other mines and compelled the men to join them. This marching continued for several days until finally on Sept. 10, 1897, a large body of marchers approached Lattimer. They were met by the sheriff of the county with a posse. They were ordered to disperse, but did not do so, when they were fired upon by the posse and 16 men were killed and others wounded.

This lamentable affair ended the strike, but it did not allay the discontent of the men, who continued to agitate their grievances, and gradually locals of the United Mine Workers of America were secretly organized. In 1900 the U. M. W., at a convention in Indianapolis, ordered all anthracite mine workers to quit work.

The managers of the coal companies had laughed at the pretensions of this soft-coal union, believing that such a small percentage of the anthracite employees were members that no attention would be paid to a strike order, so that they were much surprised on Sept. 17, when practically all the men failed to report for duty. The whole region was tied up. The operators believed that it was only a question of a short time when they would win, but did not reckon with the political situation. Mark Hanna, who was conducting the campaign for President McKinley's second election, feared that unless the strike were settled it might cause the defeat of the Republican candidate. He therefore went to J. P. Morgan and laid the matter before him. Financial interests could not brook the possibility of a change in administration at that time, so the anthracite railroad presidents were ordered to settle. The coal companies were thus compelled to open negotiations with John Mitchell and his advisers for a settlement of the strike.



Two Views of New Office Building of Lehigh Valley Coal Co., in Wilkes-Barre, Penn.

The settlement was based on a 10 per cent. advance in wages, part of which, so far as the mines were concerned, was made up by a reduction in the price of powder.

The Strike in 1902.

The men demanded other things that were not conceded, but they had gained a substantial victory, much more than the pecuniary advantage, and had succeeded in organizing the whole region, so that when their demands were refused in the spring of 1902, the call to strike was obeyed. This strike lasted until fall, and was settled by the intervention of President Roosevelt, who, with the consent of the contending parties, appointed the Anthracite Strike Commission. The award of that commission has been the basis governing the relations between employers and men ever since.

The 1900 and 1902 strikes compelled the operators to get together and to work in harmony, and as a result, they established the market value of anthracite coal on a more stable basis than ever in the history of the industry. Besides this advantage, the conditions prevailing for the past dozen years have made it possible to put

into effect at the mines measures of conservation that have resulted in a much better yield of coal from a given area of ground worked over; to institute safety measures for the protection of the employees, and to generally elevate the standards of business methods far above anything before attempted. Most of the credit for this satisfactory state of affairs is due to the late George F. Baer, president of the Philadelphia & Reading Co.

This rather lengthy rehearsal of the salient features of an industry that bears a most important part in the welfare of over one-third of the inhabitants of the United States, is for the purpose of emphasizing in the strongest possible manner the statement, that under no circumstances should it be permitted to fall back into the conditions prevailing prior to 1900.

It appears inevitable that the railroads must absolutely get out of the business of mining coal. When their mining enterprises are separated from them, a plan to manage the production and distribution of anthracite coal that will embrace practically the whole region should be adopted; in short, it should be a benevolent monopoly, directed by a supreme trustee, or board of trustees, acting in the public interest. Government ownership, which has been talked of by some legislators, would be extreme folly, for a business requiring the special training necessary to properly handle it, such as this, should under no circumstances be allowed to fall into the hands of politicians.

Price of Coal to Consumer Will Not Be Reduced

The hope of many that a severance of the relations between the railroad companies and their mining interests will result in a material reduction of the price of anthracite coal to the consumer is not likely to be realized. It is well known that many mines controlled by the railroad companies do not earn profits at all commensurate with the investment therein, and others are operated at an actual loss. Such operations when placed upon their own resources must either obtain more money for the output, or be abandoned. Therefore, should the freight rate for hauling anthracite coal to market be reduced, the amount of such reduction, or a considerable part of it, will probably be added to the price of the coal at the mine.

The permanent closing of any number of the mines now unprofitable or near that point, would be a calamity, for the present demand for anthracite coal is very nearly equal to the capacity of the whole region. The capacity cannot be greatly increased.

The suggestions made in this article, that the industry as a whole should be directed by a board of trustees or commissioners, is made at this time with a view to simulating discussion of the subject. Of course, such a plan could only be made effective with the consent and coöperation of all parties interested. The plan might be modeled somewhat on the lines laid down for the conduct of the affairs of subsidiary corporations of the New York, New Haven & Hartford R.R., although the magnitude and importance of the anthracite industry far exceeds those New England enterprises.

Duties of Proposed Commission.

It is tentatively suggested that a governing body such as indicated might be charged with the following duties:

A.—The full and complete carrying out of the agreements between employers and men.

B.—The observance of all the legitimate obligations of the several mining companies to their security and stockholders. Each company, of course, must stand on its own foundation.

C.—The output of the mines would naturally flow to market over existing transportation lines, but the commission should be empowered to direct the same to the best interest of the several mining companies, and the proper supply of fuel to the public.

D.—The commission should be empowered to fix the price at which coal should be sold to consumers after due consideration of all the factors that should justly govern.

In this connection the testimony of the late George F. Baer, president of the P. & R. R.R., in the case of the United States vs. Reading Co., the Phila. & Reading Co. et al., in 1909, is illuminating. The testimony of Mr. Baer is as follows:

> The result is that coal can be produced in the Wyoming region, where they have no serious water problems and where the veins are nearly flat, and where they are not so thick, and, therefore, less mine timber is required, at from 40 to 50c. a ton cheaper than we can. . . We, therefore, must fix a price on coal that will enable us to operate our mines, and the other regions naturally get the benefit of it. There is a natural law on that subject which has been stated by all writers on political economy. For the purpose of accuracy, I have formulated it: "The price of the entire supply of anything necessary for a community will be regulated by the cost of production of that portion of the necessary supply which is produced at the greatest expense." Anderson, Malthus, Ricardo, Smith and everybody since have practically laid down that rule, and it is a law of common sense illustrated in various ways. Here are two farms. They may be side by side; one can grow wheat to the extent of 20 bu. to the acre, the other 30, but there will be no difference in the price of the wheat. If the price of anthracite coal were fixed so as not to yield a profit to our coal and iron company, the result would be that the mines would stop for a short time, and the price of coal would necessarily go up, because the withdrawal of 30 per cent. of any commodity would naturally affect the price, and the final result would be that, the price advancing, our mines would resume operations again. Therefore, it is the general custom of the other companies, I believe, to follow our circular. We fix the best price we can get, and the Wyoming region and the people that can produce coal cheaper than we do necessarily follow our price, because it would be foolish for them to undertake to cut it when there is a market for the reasonable output of existing mines, taking it year in and year out. (Transcript of Record, Supreme Court of the United States, October term, 1911, No. 477, Vol. V, p. 1176.)

E.—Power should also be vested in the commission to prevent undue waste of coal by improper mining methods.

F.—The commission should be empowered to require uniform methods of accounting by all of the mining companies.

Coal Production During 1913 in the German Empire

The total German coal production in metric tons was 191,511,000; lignite was 87,116,000, and briquettes, 7,964,000. This output shows an increased production over that of the year previous of 10.39 per cent. in coal and 5.80 per cent. in lignite.

Germany exported in 1913, 34,573,000 tons of coal and 6,411,000 tons of lignite.

In this connection it may be remarked that the German Empire has become a formidable competitor of Great Britain in the exportation of coal and coke.

New Power Developments of the D., L. & W. Coal Co.

By H. M. Warren*

SYNOPSIS—This company has recently installed a large power plant at Nanticoke, Penn., containing 4000-kw. turbo-generators using superheated steam. An exhaust-steam turbine unit, supplied with a Rateau regenerator and a cooling tower, located at Kingston, operates in multiple with the above plant.

In 1905, the Delaware, Lackawanna & Western R.R. Co. constructed near the town of Nanticoke, Penn., an electrical generating station containing three 303-hp. Babcock & Wilcox boilers, and three 500-kw. vertical Curtis turbines, generating current at 4150 volts, 3 phase, 60 cycles.

The station was built large enough, however, so that later two additional boilers and two additional turbines were added, making a total capacity of 2500 kw. The load on this plant gradually increased until the station became much overloaded.

About two years ago it was decided to increase the capacity of this plant, and as the new mining developments in this section will require a constantly increasing amount of electrical power, it was considered advisable to design the addition to accommodate turbines of large capacity. The addition is now constructed and contains two 4000-kw. Allis-Chalmers turbines, each having a maximum capacity of 6000 kw. The boiler plant is arranged to accommodate 20 Babcock & Wilcox 303-hp. boilers, set in batteries of two boilers each. At the present time, however, only eight boilers are installed, although the foundations are completed for the entire number.

Fig. 1 is an exterior view, showing the addition to this plant, the old installation being seen in the rear. It will be noted that the turbine room proper is inclosed by a temporary wall at the end, the general design being such that additional generator capacity can be installed by extending the generator room as designed, providing the necessary increase in boiler capacity in a building or buildings constructed at right angles to the original boiler room.

Fuel Is Delivered in Railroad Cars

Fuel is delivered in railroad cars directly over the coal bunkers, from which it runs by gravity through vertical pipes to the boiler room, where it is hand-fired to the boilers. As the fuel used is locally known as No. 2 Barley, a size smaller than Barley, or No. 3 Buckwheat, it contains a considerable amount of very fine material, causing large quantities of dust, and in designing the boiler plant, particular attention was given to so arrange the settings, ashpits and main flues, that this large volume of material could be flushed from these various points by means of water into the ash cars. This is an important point, for if provisions were not properly made to handle this dust, the expense of removing it or the consequent inefficiency of operation if it were allowed to accumulate, would be objectionable from an operating point of view.

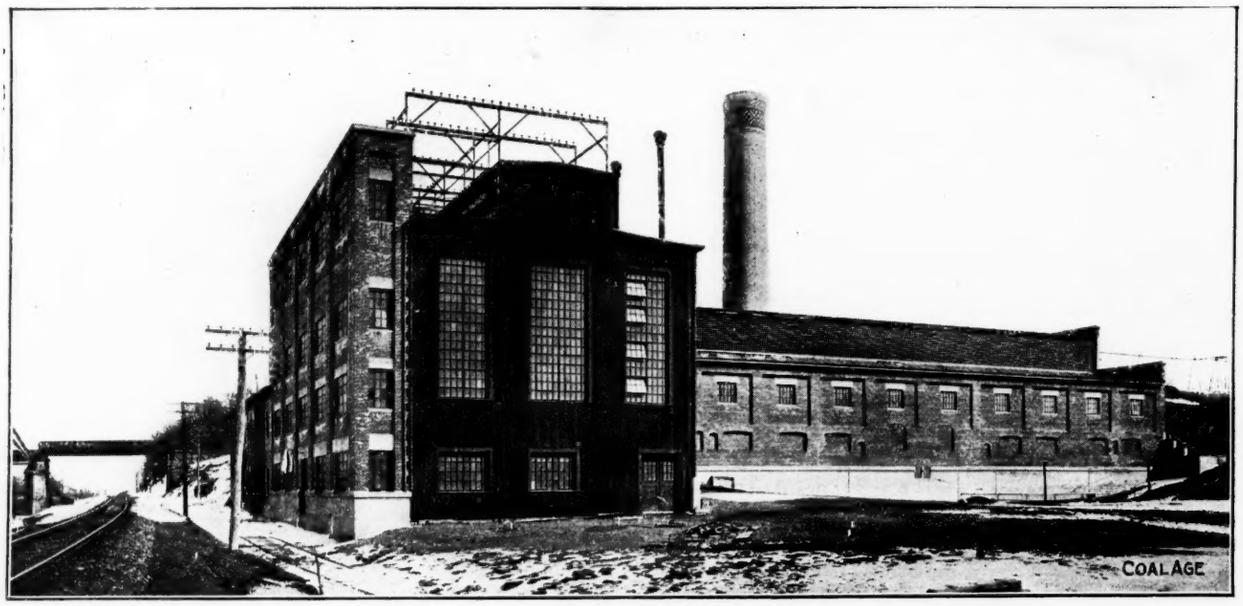


Fig. 1. Exterior View of Power-Plant Addition

Referring to Fig. 2, showing a section through the boiler plant, the general arrangement will be noted. The dust referred to is flushed from the ash pit, and the space back of the bridge-wall, through the two pipes shown in the section, into the ash car.

The grates are of the stationary pinhole type, having about 4½ per cent. air space. In cleaning these, the ash is pulled forward and allowed to drop through removable

*Electrical engineer, Delaware, Lackawanna & Western R.R. Co., Scranton, Penn.

dead plates into the ash car as shown. Thus there is no accumulation in the ash pit proper, except such fine dust as may work through the grates. This is actually a comparatively small amount.

As forced draft is used, it is important that the ash pit be kept tight, to prevent air leakage; and to take care of this situation a 4-in. wall consisting of a single course of brick is built from the foundation vertically to the front end of the grates and back of the dead plate. As a result, the ash pit is always practically air tight, and all trouble is avoided due to any air leaking out through what would normally be the ash-pit doors.

As only eight boilers are installed at present, only the main flue required to serve them and the two additional boilers that will be installed later on this side of the plant, was built. The flue on the opposite side of the plant will be constructed when required.

Referring to Fig. 4, the general arrangement of the main flue and stack is shown. The bottom of the flue is pitched toward the stack from either end and the entire conduit is lined with glazed hollow tile. This material was used because of the heat to be withstood, and the fact that water will be used for flushing out the dust.

When cleaning the flue, water is introduced through one or more cleaning doors located in the building wall next to the flue, the material running out to the point in the center of the plant to an opening in the main floor. From this point, it runs through a pipe under the boiler foundation into the ash pit, where it is delivered into the ash car.

The ash-pit floor is pitched so as to drain to five rectangular sumps. These are covered with cast-iron gratings and are connected together near the top by tile pipe. The material in suspension can settle in these tanks, but the water is allowed to run free, discharging finally through an overflow pipe to the outside. The sumps can be cleaned as occasion requires.

The steel ash cars are provided with roller bearings and arranged for side dumping. After being loaded they are pushed by hand to the turntable shown and from there to a point just outside of the building, at the curved portion of the track. From this point they are hauled up an incline by means of a small steam-driven hoist, located at the elevation of the fuel track. The ash is at the present time dumped, from this elevation, to form a fill that can at some later date be used for additional fuel tracks which may be required if a new boiler plant section is built. Later on, it is proposed to load the ash into railroad cars for final disposition.

The boilers, rated at 303 hp. each, are set in batteries of two. The grates are 11 ft. 6 in. wide, 8 ft. deep, and have a total area of 92 sq.ft. The ratio of heating surface to grate area is 33 to 1.

Superheated Steam Is Used

Each boiler is equipped with a B. & W. superheater, designed to give 150 deg. superheat. As the temperature of the superheated steam increases as the boiler is forced, the number of boilers actually using forced draft, at any time during the day, is varied, depending upon the load, and in this manner the temperature of the superheated steam is kept practically constant regardless of power requirements.

The usual boiler-plant auxiliaries, such as blast fans for producing the forced draft, boiler feed-water heater, and feed-water pumps, are located in the turbine room instead of in the boiler room, this having been considered desirable as the turbine room is naturally cleaner, and in addition all the machinery is in this way placed under the supervision of the operating engineers.

Two Jeffrey single-inlet blast fans, each 9 ft. in diameter and 3 ft. 6 in. wide, are located at one end of the ash tunnel, see Fig. 4. These deliver air to the two air tunnels from which it reaches the ash pits, being controlled by dampers in the bridge wall.

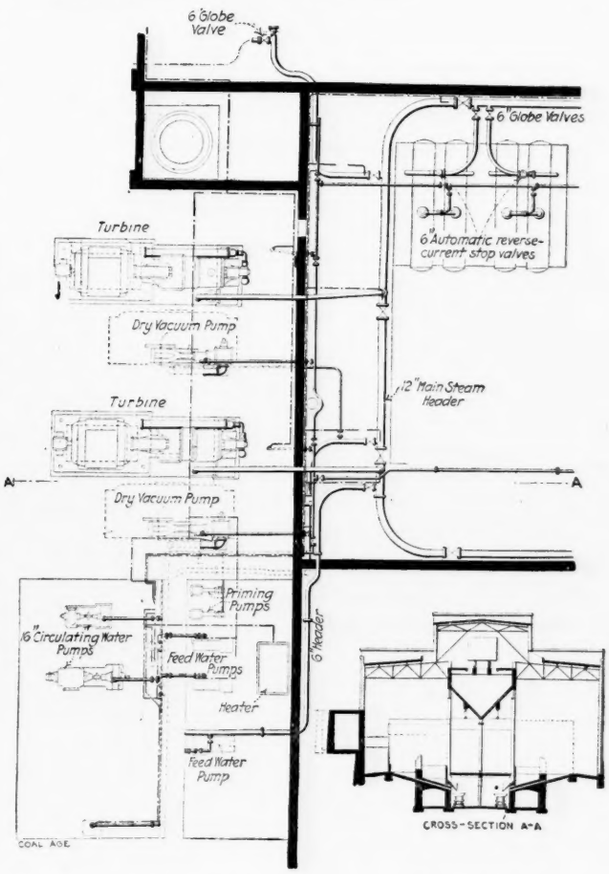


Fig. 2. Part Plan of Plant and Section through Boiler House

With the blast fans located in the ash tunnel, as shown, all the air used for the forced draft must be drawn through this tunnel. This insures a supply of good air at all times in the tunnel, eliminating any danger of the ashmen being overcome by gas.

In the summer time the air entering the tunnel will come through the opening in the side of the foundation wall through which the ash cars are taken; also through the doors at the foot of two stairways that lead from the firing-floor level into the ash pit. In the winter time, however, in order to avoid freezing in the ash tunnel, most of the air will be taken through the doors leading from the stairways with the opening of the ash track to the outside air partially or entirely closed.

The stack, which was built by the M. W. Kellogg Co., is 12 ft. in diameter, 125 ft. in height, from the top of grates, built up of hollow radial brick with an expansion

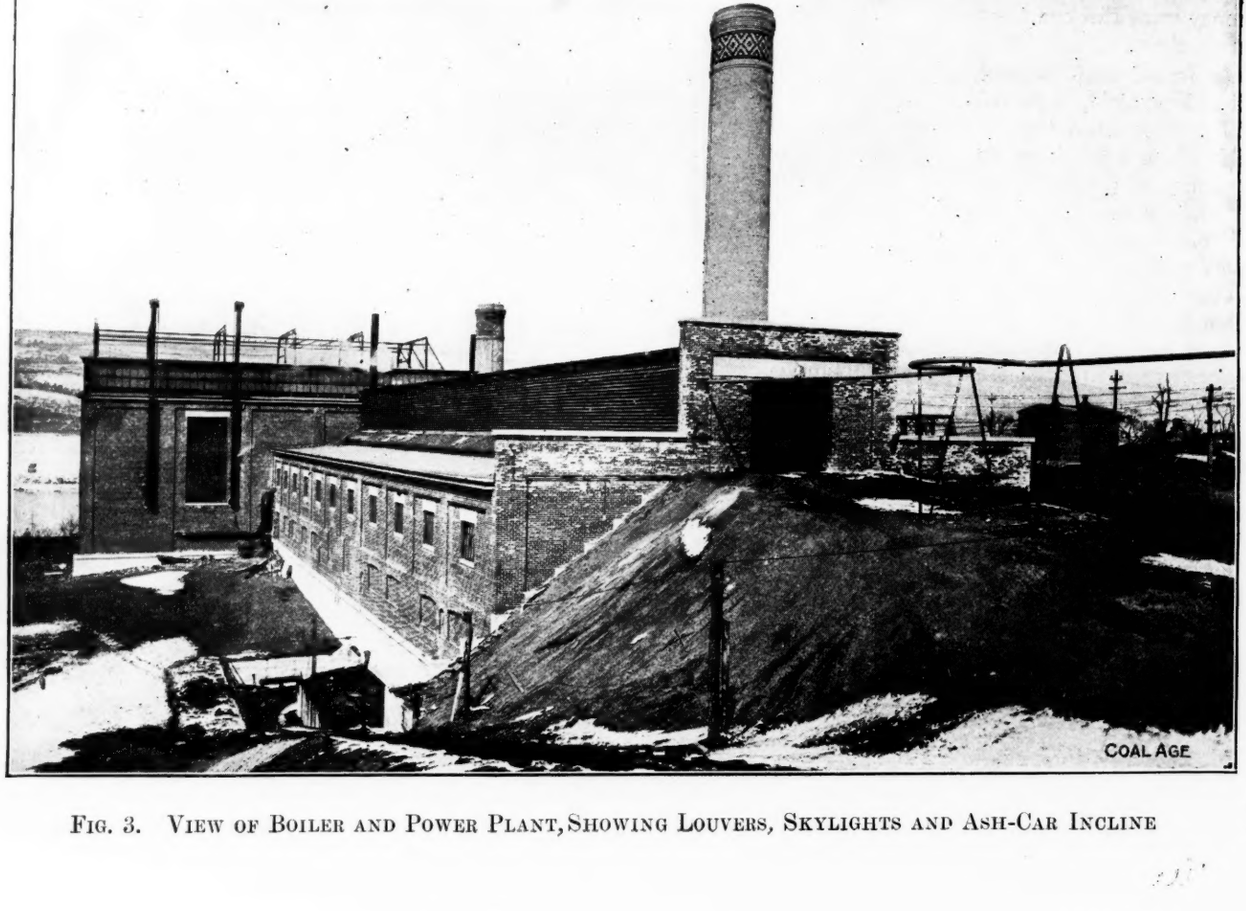


FIG. 3. VIEW OF BOILER AND POWER PLANT, SHOWING LOUVERS, SKYLIGHTS AND ASH-CAR INCLINE

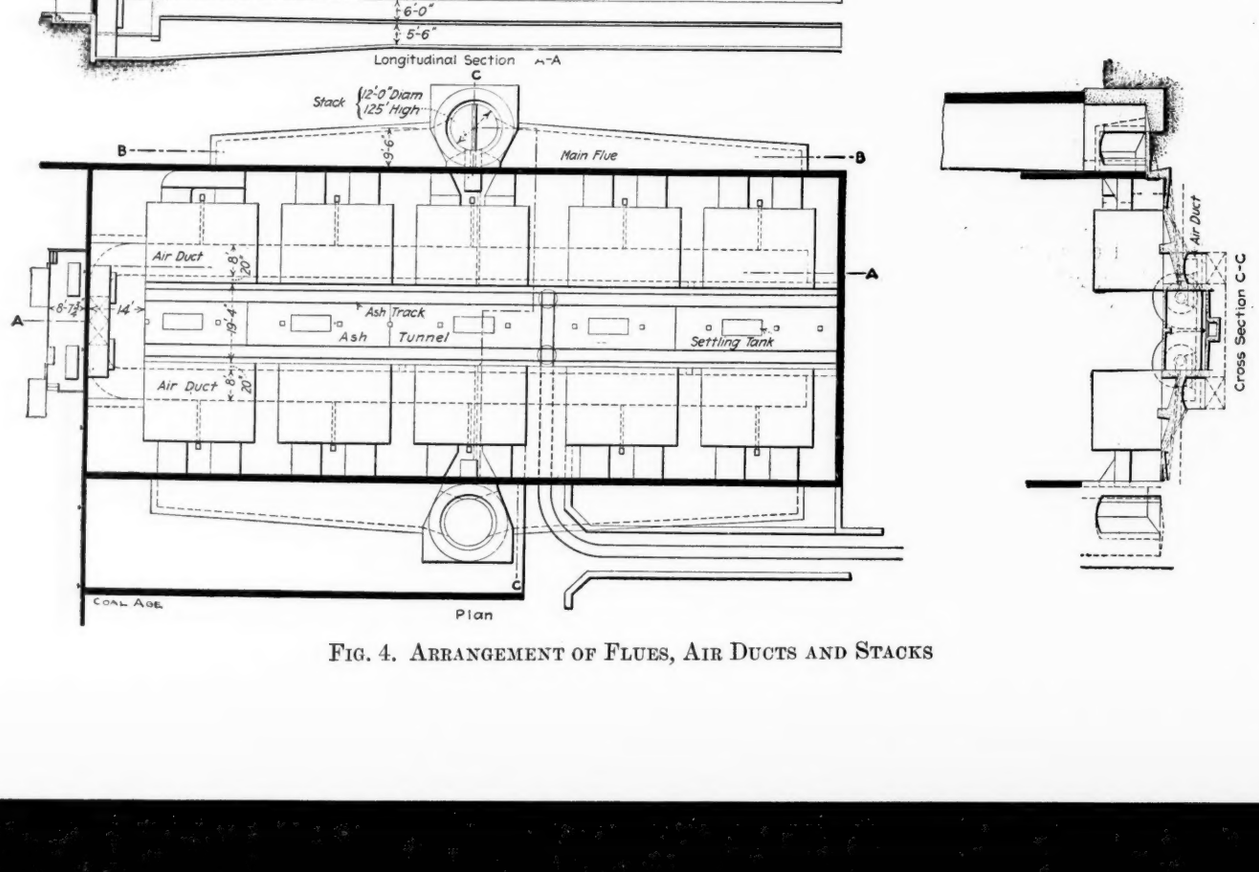


FIG. 4. ARRANGEMENT OF FLUES, AIR DUCTS AND STACKS

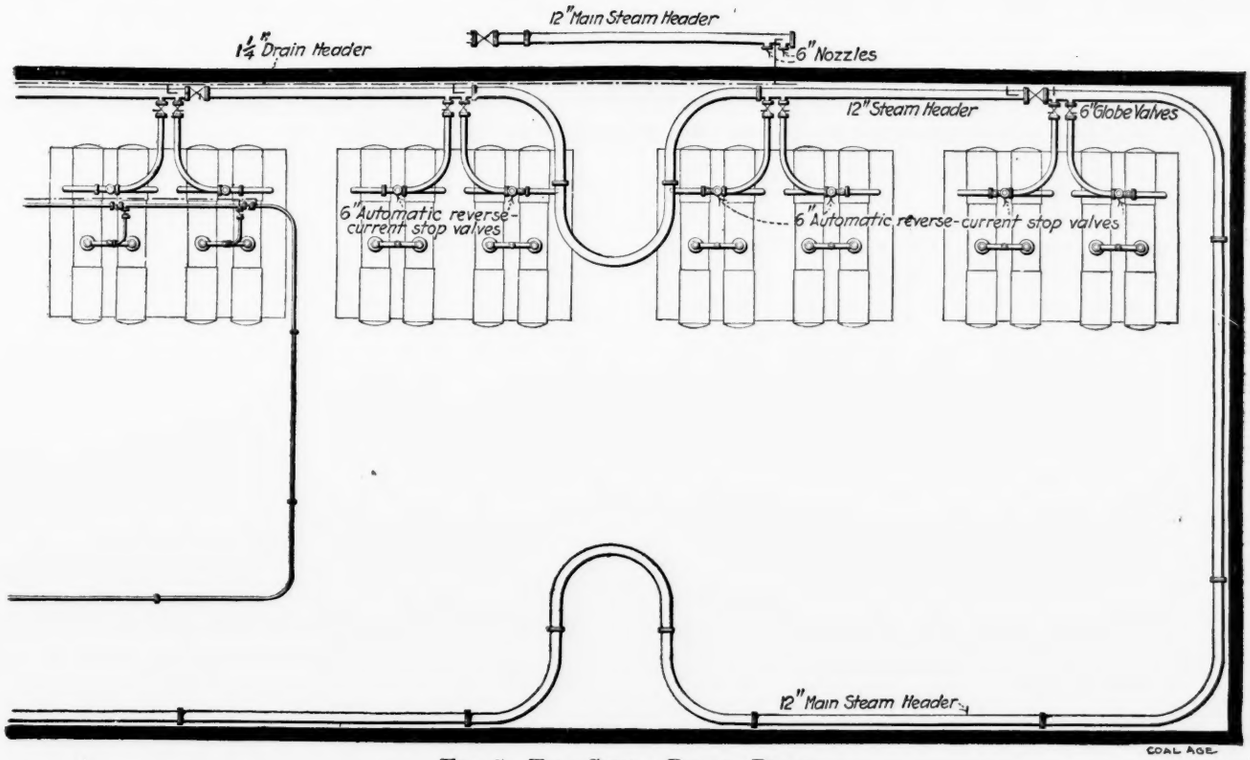


FIG. 5. THE STEAM-PIPING PLAN

lining wall extending on the inside for 30 ft.; a vertical partition rising from the base of the stack to a point 5 ft. above the flue opening insures proper draft conditions, in the event of only a portion of the boilers being used. This stack is protected by lightning rods of the usual construction.

In Fig. 3, note the incline up which the ash cars are drawn to the fuel-track level. In order to insure a free ventilation of the boiler room, louvers are extended the entire distance of the monitor. These are made of monel metal, in order to avoid any trouble due to action of the gases that might escape from the firing room.

In addition to the windows in the side of the boiler room, light is provided by a wire-glass skylight running the entire length of the boiler plant on each side of the monitor, extending on an incline from the bottom of the louvers to the main roof, as shown in the photograph.

As ashes were used for a considerable portion of the main fill on which the fuel cars are handled, and as there was a possibility of these taking fire, rock and clay were first dumped against the retaining-wall at the end of the building, for a considerable distance in order to eliminate any chance of fire injuring this wall, and as the main flue was built of concrete, although lined with hollow glazed tile, it was protected in the same manner before leveling off the ground with ashes.

A Loop Piping System Is Employed

The final arrangement of the high-pressure steam main is such that it forms a loop around the interior of the

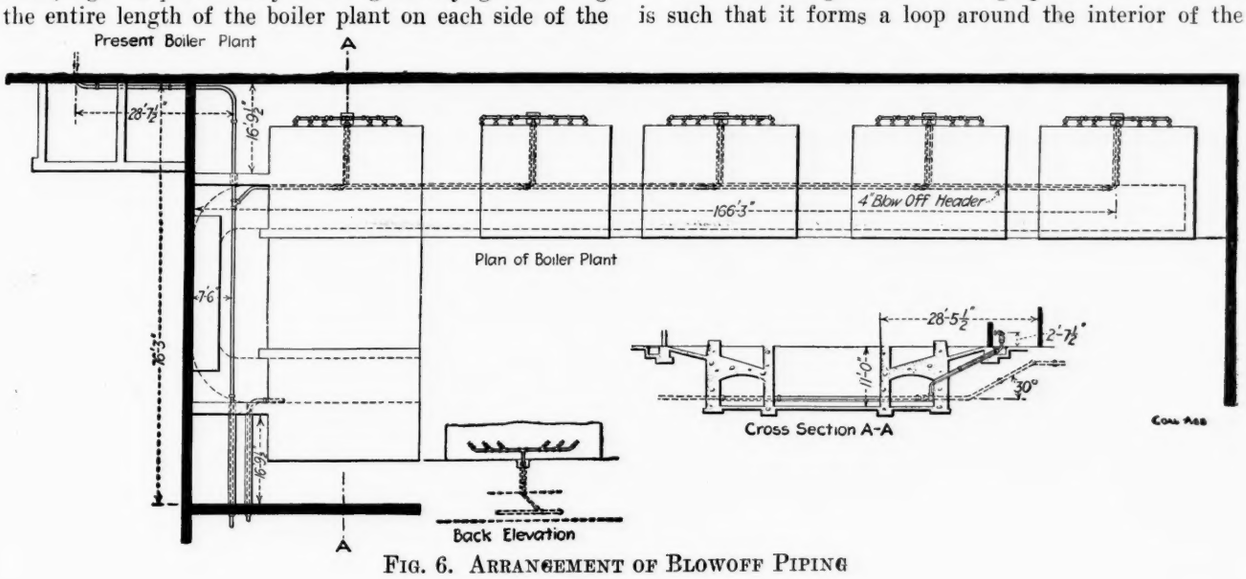


FIG. 6. ARRANGEMENT OF BLOWOFF PIPING

boiler plant, running back of the boilers and being supported from the building wall on brackets. As only eight boilers are installed at present, the loop is not completed and ends with the eighth boiler. It is also blanked off where the branch leads into the turbine room for supplying steam to the circulating pumps.

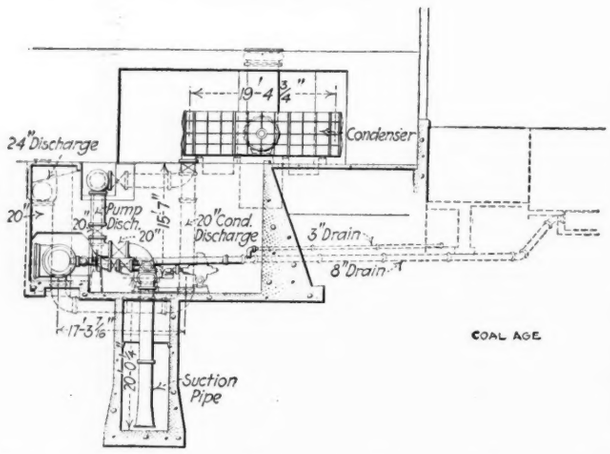


FIG. 7. SUCTION AND DISCHARGE PIPING OF CONDENSER

Each boiler is connected to the main through a non-return valve placed on the boiler outlet and a stop valve where the boiler lead enters the main. These two valves insure absolute safety when a boiler is cut out for inspection.

All high-pressure piping is made up of standard full-weight pipe, provided with reinforced Vanstone joints. Where the size of pipe is too small to permit this joint, the flanges are welded. Fittings are avoided as much as possible by the use of welded nozzles, therefore eliminating a large number of joints. On the superheated steam lines where it is necessary to use any fittings, they are made of cast steel. The valves were manufactured by the New Bedford Valve Co. and those used on the superheated-steam lines have cast-steel bodies, nickel-bronze seats and disks and nickel-steel stems.

As it was not considered advisable to use the high-temperature superheated steam on the blast-fan engines, rotative dry-vacuum pumps, priming pumps, and service pumps, the 4-in. high-pressure main is connected to four boilers to provide dry saturated steam for these units.

The boiler feed line extends from the feed pumps in the turbine room through the boiler room, returning in the form of a loop. This is a cast-iron line, except where bends occur to provide for expansion. These are made of wrought-iron pipe, with welded flanges. Each boiler is equipped with a high- and low-water alarm and a "Watch-dog" automatic feed regulator.

Blowoff piping is arranged, as shown in Fig. 6, to consist of steel pipe with welded flanges, and cast-steel fittings where required. All joints are male and female to prevent any possible chance for gaskets blowing out while the pipe is in operation. The blow-off connections for each battery of boilers are led to a common pipe as shown, this passes through a pipe laid in the concrete foundation of the boiler to the air duct, where it connects to the main blow-off pipe. This leads out through the building to a blow-off tank.

TWO 4000-KW. TURBINES ARE INSTALLED

The turbine room contains two Allis-Chalmers Mfg. Co.'s high-pressure steam turbines, operating at 1800 r.p.m., having a normal rated capacity of 4000 kw. and a maximum of 6000 kw. These are each connected to a 13,500-sq.ft. rectangular horizontal-flow surface condenser having 1-in. tubes. The condensate of each machine is pumped out by a two-stage turbine-driven centrifugal

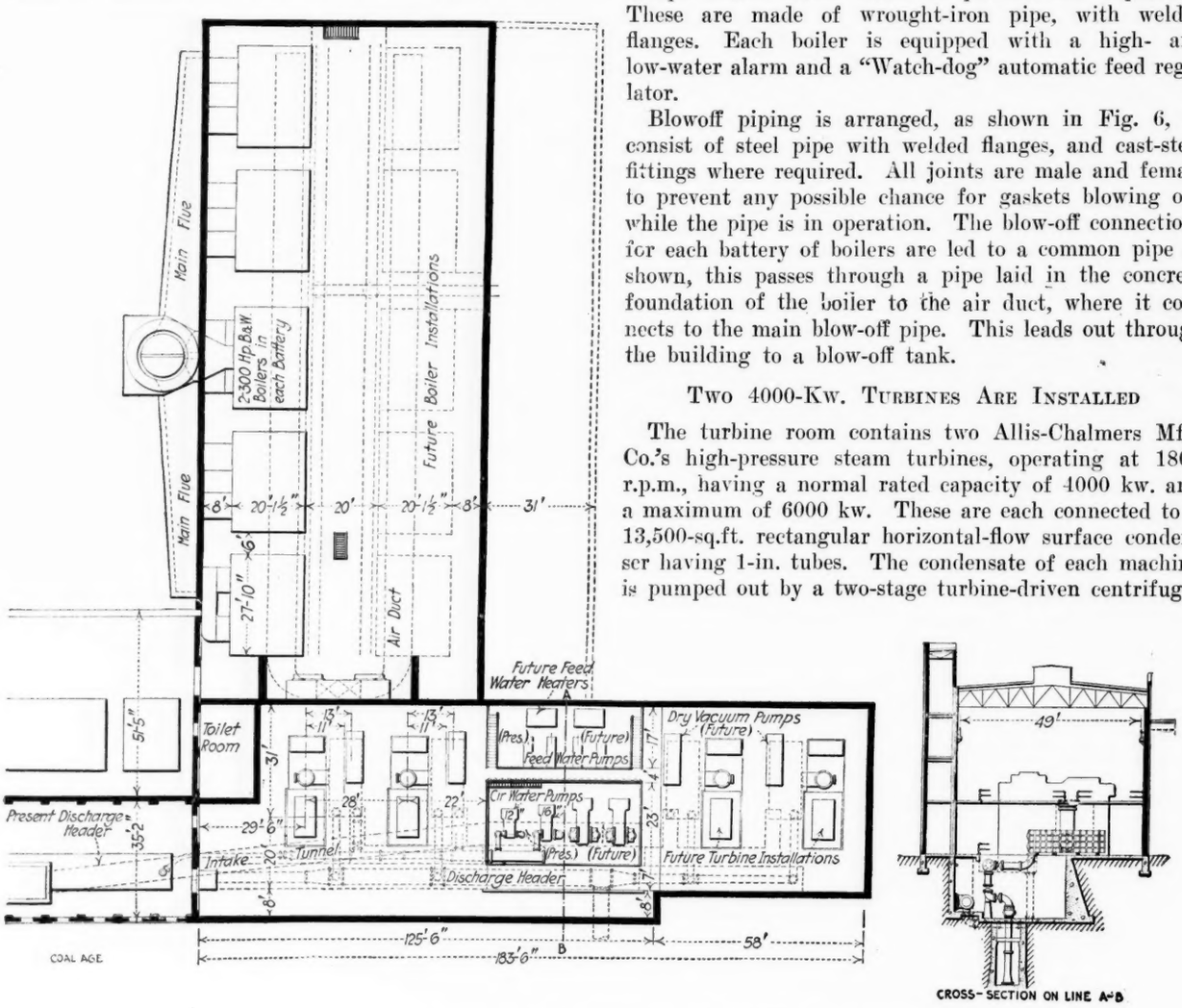


FIG. 8. GENERAL LAYOUT OF ENTIRE PLANT, SHOWING PROVISION FOR FUTURE INSTALLATIONS

pump, designed to deliver against a head of 30 ft. to the feed-water heater. Each condenser equipment is also served by a 12x30x18-in. horizontal single-phase rotative dry-vacuum pump.

The circulating pumps consist of an 8000-gal. per min. bi-impeller centrifugal pump driven by a noncondensing steam turbine and a 4000-gal. per min. single-impeller centrifugal pump similarly driven. The condensers, with their auxiliary equipment, were furnished by the Alberger Pump & Condenser Company.

The condensing water is taken from the Susquehanna River, which flows parallel to the power plant and about 200 ft. distant. At the old plant at Nanticoke, there was provided a vertical shaft in the turbine room connected to the river by a tunnel. This tunnel was partitioned in the center, one side acting as an intake for the water, and the other, as the discharge.

On account of the additional amount of water required for future service, it was decided to use this tunnel entirely as an intake, discharging the circulating water to the river through a 48-in. cast-iron pipe.

As the Susquehanna River rises about 22 ft. in the wet season, it is necessary to either use vertical pumps, placing the driving turbine or motor above the high-water mark, or to provide a practically water-tight pit. The latter scheme was employed in the addition, a large shaft being sunk in the rock and connected to the bottom of the old shaft by means of a rock tunnel. In this excavation and at the proper elevation, a heavy concrete floor was provided, on which rest the turbine-driven circulating pumps, at such an elevation that they will lift the water without difficulty when the river is at its lowest point, the floor being sufficiently impervious to exclude practically all the water when the river is high.

A Water Seal Is Formed

In order to reduce power required to handle the circulating water to the lowest possible amount, the connections are such that after the water passes through the condensers, it is piped downward to a point below the level of the 48-in. discharge line so as to form a seal and in this way obtain the advantage of the vacuum due to water dropping this distance. This works out satisfactorily in practice, and at times the advantage obtained has been such as to produce 13 in. of vacuum at the top of the condenser—thus reducing the average effective head of the circulating pump about 14½ ft. See Fig. 7.

There are three boiler-feed pumps, two being Alberger centrifugal pumps, each having a capacity of 250 gal. per min. against a pressure of 165 lb., each driven by a Kerr steam turbine; the third is a 5-in. 3-stage Alberger centrifugal pump having a capacity of 500 gal. per min., and driven by an Alberger Curtis turbine.

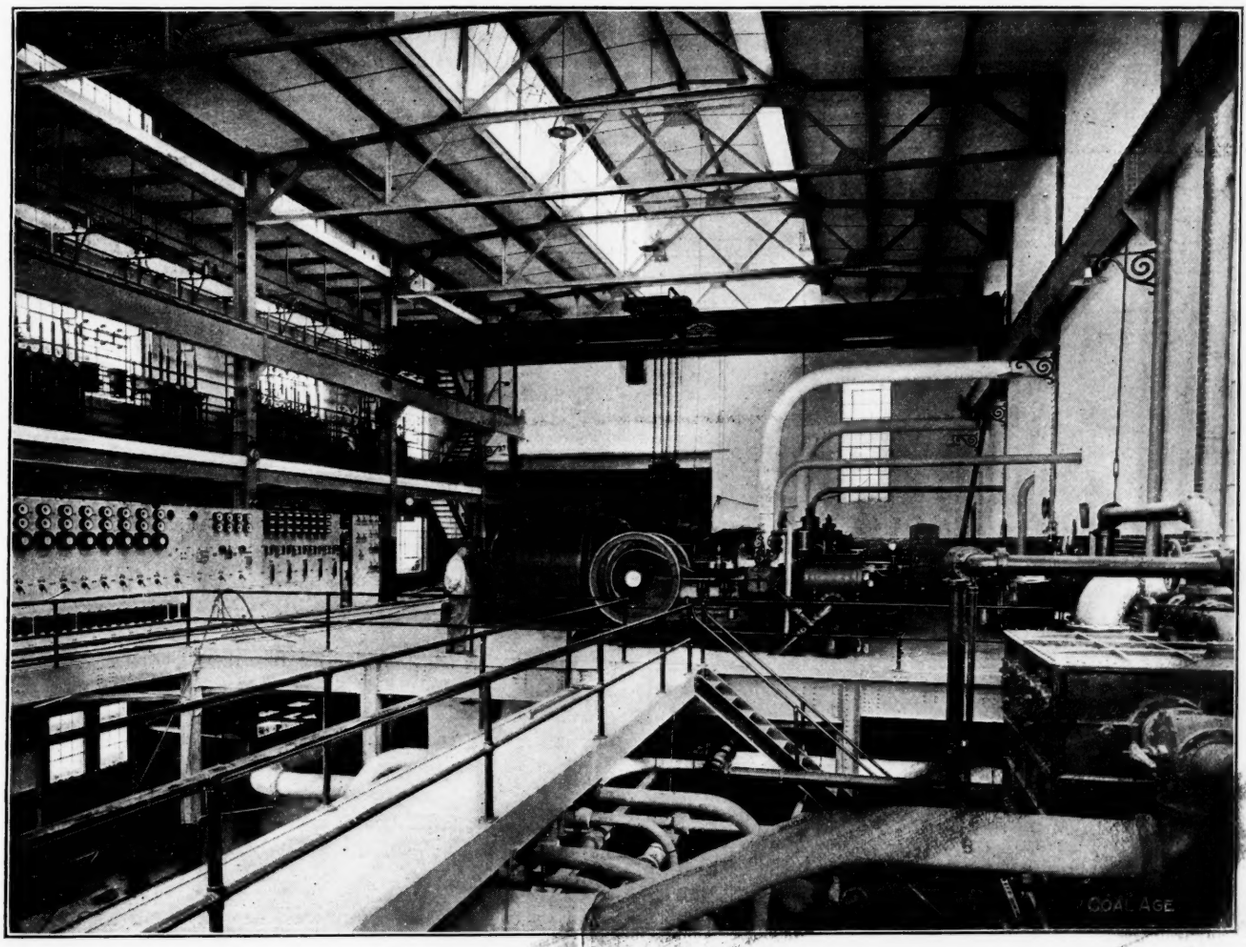


Fig. 9. Interior of Turbine Plant

To provide a constant head of water available for the sealing glands of the turbines, a steel tank is located at one end and at the top of the switchboard gallery. To this, water is piped from a high-pressure water-supply line, the pumping plant of which is also located at this power plant, and also from the service pump located in the shaft. Float valves placed in this tank control the flow of water from these lines, thus insuring a constant supply at all times and at a uniform head, eliminating the possibility of losing the vacuum on the turbines due to a failure of water for the sealing glands.

It will be noted that all of the auxiliaries are steam rather than motor driven, and all of the turbine-driven auxiliaries are supplied with superheated steam. The exhaust from all is led through the exhaust piping to a 6000-hp. Cochrane feed-water heater. Arrangements

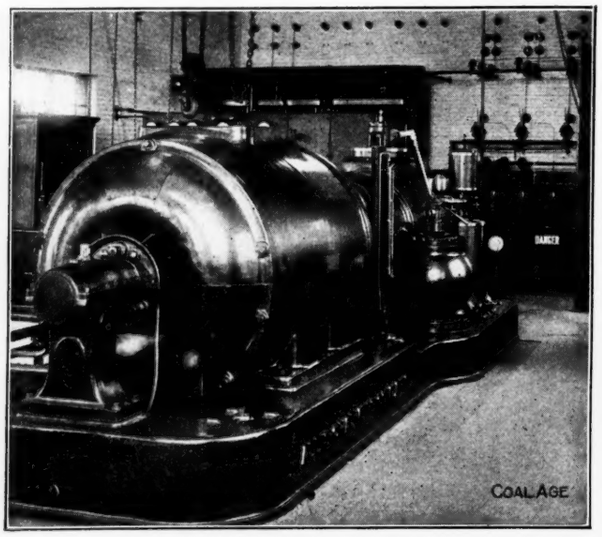


FIG. 10. ONE THOUSAND-KILOWATT, LOW-PRESSURE TURBINE UNIT

have been made so that an additional 6000-hp. heater can be placed alongside the present one, at some future date.

A 20-ton hand-operated traveling crane is available for handling all the equipment, except the two Ridgway (11x16-in.) blast-fan engines and the condensers. To facilitate the removal of tubes and cleaning of condensers, I-beams are supported from the steel work of the turbine floor, and located in front of the condenser heads, so that by means of an ordinary chain hoist and trolley on the I-beam, these heads can be easily handled.

THE OPERATING SWITCHBOARD IS ON THE TURBINE FLOOR

From the photograph, Fig. 9, showing the interior of the power plant, the general arrangement of the switchboard and high-tension switches can be seen. The operating board is placed on the turbine-room floor, for easy access of the watch engineer. The new portion of the board, with its oil switches and current and potential transformers, choke coils, and instruments, was furnished by the Westinghouse Electric & Manufacturing Co. The old portion of the board, shown near the right-hand end of photograph, furnished by the General Electric Co., was formerly in the old station and has recently been moved, so that all the switchboard panels will be together.

High-tension oil switches are of the remote-control solenoid-operated type and, as will be noted, are placed on the gallery above the operating board. In this manner, all high-tension current is kept away from the operator and confined to the high-tension switch gallery and the gallery above, in which are placed the choke coils, and lightning arresters, with their disconnecting switches.

The direct-current power required for operating the high-tension switches and overload relays, is furnished by a set of lead storage batteries, consisting of 60 cells, having a capacity of 80 ampere-hours. These cells are charged by a small motor-generator set. They also furnish power to an emergency lighting circuit, in case the turbines should, for any reason, fail. In this event, a switch automatically connects the battery referred to, to a lighting circuit in the boiler room and one in the turbine room.

This plant supplies electric power to the Truesdale, Bliss, Auchincloss, Avondale, Loomis and Woodward Col-

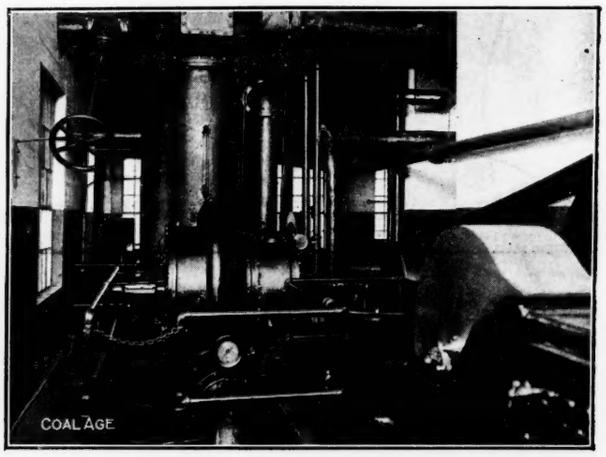


FIG. 11. LE BLANC CONDENSER, BELT DRIVEN FROM A RIDGWAY ENGINE

lieries. Because of the distance to the Woodward colliery and the fact that this line will eventually be extended still farther, the voltage of this circuit is stepped up from 4150 to 16,000 volts. At the Woodward colliery, and operating in multiple with the Nanticoke plant, is a 1000-kw. Allis-Chalmers exhaust-steam turbine.

EXHAUST-STEAM TURBINE PLANT, WOODWARD COLLIERY, KINGSTON, PENN.

This exhaust-steam turbine, Fig. 10, draws steam from the various engines about the colliery, such as those driving mine-ventilating fans, breakers, generators and hoists. There is available about 20,000 lb. of steam per hour from engines that operate at practically a constant load, and in addition to this, there is an extremely variable quantity of steam from the hoisting engines, which averages about 20,000 lb. per hour, making a total of 40,000 lb.; but because of the variations due to the hoisting engines, the exhaust steam is first taken through a Rateau regenerator. This is about 40 ft. long, 6 ft. 6 in. in diameter, and contains about 40 tons of water.

From the regenerator the steam passes through a large Sweet separator next to the turbine. A Le Blanc condenser, Fig. 11, together with its air pump, is driven by a belt from a four-valve Ridgway engine, which also drives

the exciter. As no adequate supply of condensing water was available, it was necessary to use artificial cooling. The water after it leaves the condenser is accordingly pumped direct to the top of a Henry R. Worthington combined forced- and natural-draft cooling tower, see Fig. 12.

Because of the necessity of using a cooling tower, it is important that the condenser be as efficient as possible in order to keep down the amount of circulating water required, or, in other words, it was advantageous to employ a condenser equipment which would operate at a temperature very close to the theoretical. This would not only keep down the amount of water circulated, but would also deliver the same through the cooling tower at the highest possible temperature under the given conditions. This, in turn, would tend to make the cooling tower more efficient.

Ordinarily, the Le Blanc condenser would have been driven by a steam turbine, but because of the large amount of power required to operate the condenser equipment when delivering water to the cooling tower, the quantity of steam taken by an outfit using a turbine drive, was considered excessive. For this reason, a belted

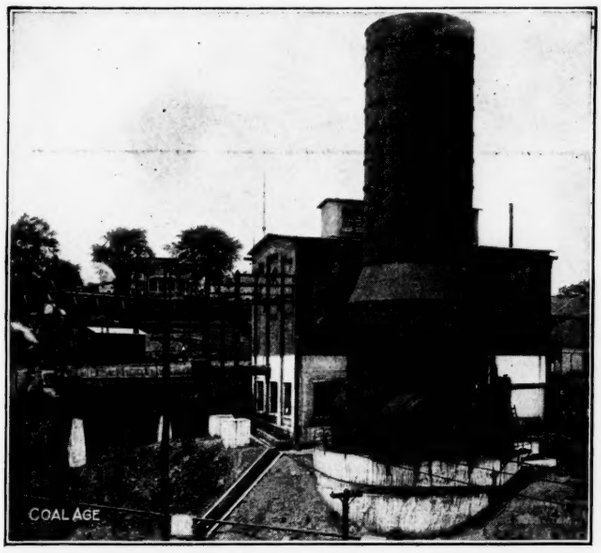


FIG. 12. EXTERIOR VIEW OF WOODWARD PLANT, SHOWING COOLING TOWER AND REGENERATOR

equipment was used, with the result that the steam consumption required to do this work was about half what it would have been with the turbine. With the engine drive, considering the fact that the exhaust from this machine passes through the low-pressure turbine, the efficiency of this unit, as will be readily seen, is extremely high.

The cooling tower, being of the natural- and forced-draft type, is equipped with four fans which are driven by a vertical Troy engine. Under actual operating conditions, with the barometer normally at 29.2 in., the vacuum on the turbine is from 26 to 28 in., depending on the outside temperature—the vacuum in all cases corresponding closely to that theoretically possible, considering the temperature of the injection water and the height of the barometer.

This turbine unit delivers power at 4150 volts, 3-phase, 60 cycles, and as before stated, operates in multiple with the Nanticoke plant, but because of the transmission line having a higher voltage, transformers are installed at this plant to step up the potential. One feeder, however, runs direct to the colliery substation inside the mines, at 4150 volts.

As this turbine can only run at such times as exhaust steam is available, the normal operation is for about 10 hours each working day. The output averages about 8300 kw.-hr. per day, about two-thirds of which is used at this colliery, the remainder being transmitted back to the Nanticoke plant.

As there is a steam plant at this colliery, operating during the day at about 3500 boiler-hp., the necessary boiler feed water is taken from the discharge of the condensers at the low-pressure plant, and an equivalent amount made up into the cooling tower basin from water mains. This materially assists in keeping down the temperature of the injection water.

The Oldest Mine in Anthracite Regions

The Lehigh Coal & Navigation Co.'s No. 1 Tunnel at Nesquehoning, Penn., which was originally known as the Room (Rhume) Run Tunnel, is undoubtedly the oldest anthracite mine tunnel in operation. The exact date of opening is not positively known, but is presumed to be 1830. The Room Run Railroad, built to carry the coal from this tunnel to Coalport, was constructed in 1831, and the tunnel had unquestionably cut some of the veins prior to this date.

"Statistics of Coal," by R. C. Taylor, published in 1855, states that 334,929 tons of coal were secured from this tunnel in the year 1837, and that eight seams were being worked in 1847.

This tunnel has been in continuous operation since its opening, the present daily output being about 1300 tons. Coal will likely be brought out through the tunnel for a period 30 years longer.

Engineers' Society of Western Pennsylvania

On Friday, May 29, the society organized a metallurgical and mining section. A paper on the "Progressive Alteration of Coals of the Northern Appalachian Fields" was read by David White, chief geologist, U. S. Geological Survey, Washington, D. C.

The society visits today, Saturday, June 6, the works of the Keystone Coal & Coke Co., near Greensburg, inspecting a modern coal washer and Belgian coke ovens at the Huron mine and a large electric rope haulage at the Crow's Nest workings.

Interesting Articles Next Week

The June 13 issue of COAL AGE will contain a number of articles of much value to all coal-mining men. One article will suggest that reinforced-concrete mine timbering has advantages over steel and wood. Another will deal with the engineering methods of the Lehigh Valley Coal Co. A third article will describe a new steam hoisting engine. Other subjects covered will be "A Novel Lining for Shafts," "Reliability of Electric Signals in Mines," etc.

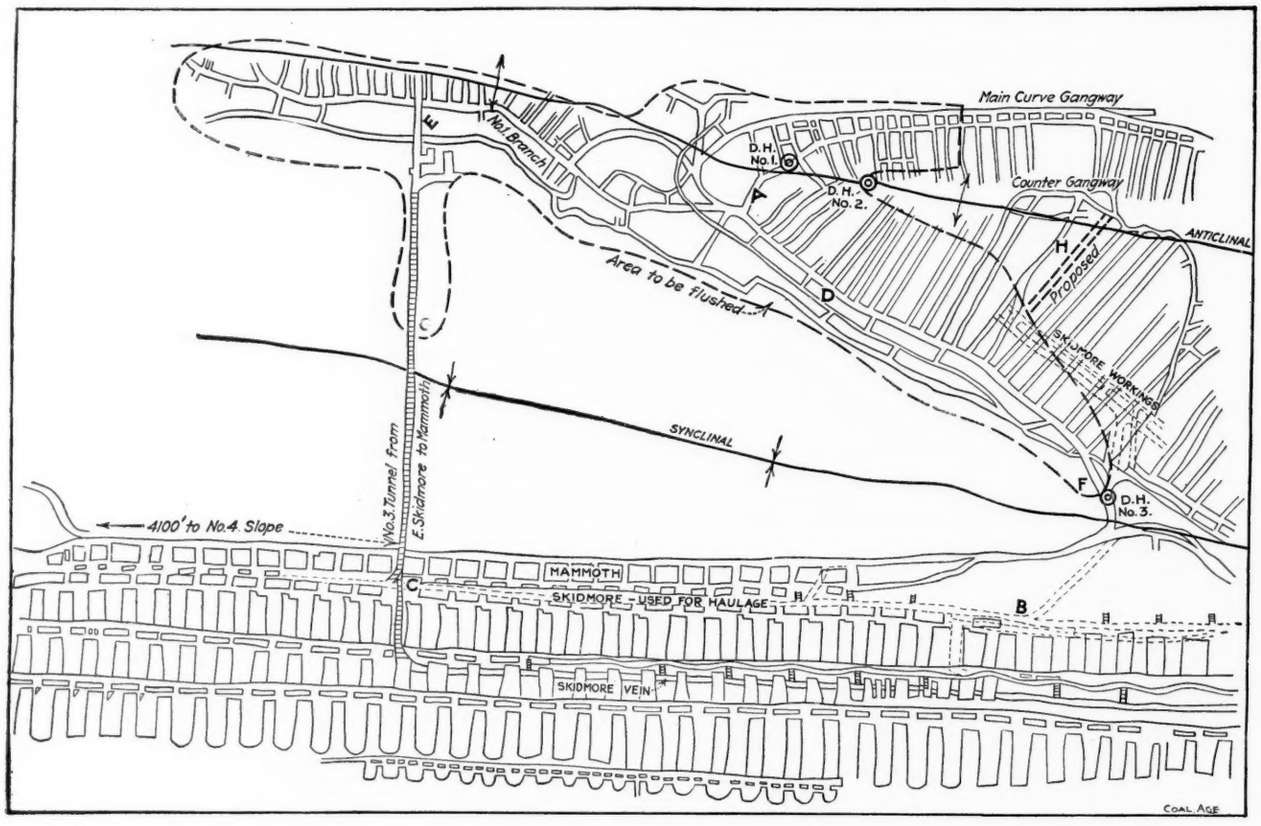
The New Mine Fire in the Panther Creek Valley

By A. T. Shurick

SYNOPSIS—A brief description of the new fire at the Lehigh Coal & Navigation Co.'s operations. The fire was practically beyond control before discovered, and will be sealed off, and the workings flushed. Extensive preparations for carrying this out are under way, including the construction of two miles of standard-gage railroad.

Any mention of a mine fire in the Panther Creek Valley must inevitably convey thoughts of the disastrous Summit Hill fire, the largest in the history of the mining industry of this country, if not the world. This historical conflagration stubbornly resisted every effort to extinguish it, made at intermittent intervals, for more than half a century, during which time approximately a million and a half dollars were expended.

The climax was finally reached in 1909, when it threatened to break out into the main Panther Creek basin, where every mine of the Lehigh Coal & Navigation Co. would have ultimately been threatened with it. It therefore became necessary to resort to heroic measures, and the famous concrete wall, costing approximately half a million dollars, was hurriedly built, and has since successfully kept the fire confined within the desired restricted area. But even yet it is constantly watched, and is a source of no little uneasiness to the mine officials.



Map of Territory Contiguous to the Fire, Showing Extent of Proposed Flushing Operations

Some Other Mine Fires in This District

While the new fire is not in any way connected with the old original Summit Hill conflagration, it is none the less interesting to note that the present trouble is in the hands of engineers who have had a great deal of experience along this line. It might be added further that the bituminous engineer has little conception of what an anthracite mine fire in the Mammoth Vein means. The physical conditions of operations in this vein are such that large areas are mined, which are practically inaccessible for either inspection or survey, and it was in such a place as this that the new fire originated.

The fire occurred at the point *A* on the south side of the Lansford Basin in No. 23 chute off the No. 1 branch gangway in the eastern workings of No. 4 slope, which latter lies about one mile southeast of the town of Lansford. This mine is one of the oldest in the district, having been started previous to the Civil War, although the workings in which the fire occurred are comparatively modern.

These same workings were the scene of another serious fire about 1902. This trouble occurred in the No. 8 breast, and three men were scalded, an accident that seems to be peculiar to anthracite fire fighting. Instead of throwing the water cautiously on the base of the flame,

it was played recklessly on the main portion of the fire, with the result mentioned.

Origin of the Present Fire

The workings in which the present fire occurred had been standing idle for about three months, pending improvements and changes in the ventilating system, and were only again being reopened. It is therefore impossible to say just how long the fire had been burning; it may have been smouldering for some time and made rapid headway when the ventilation was restored.

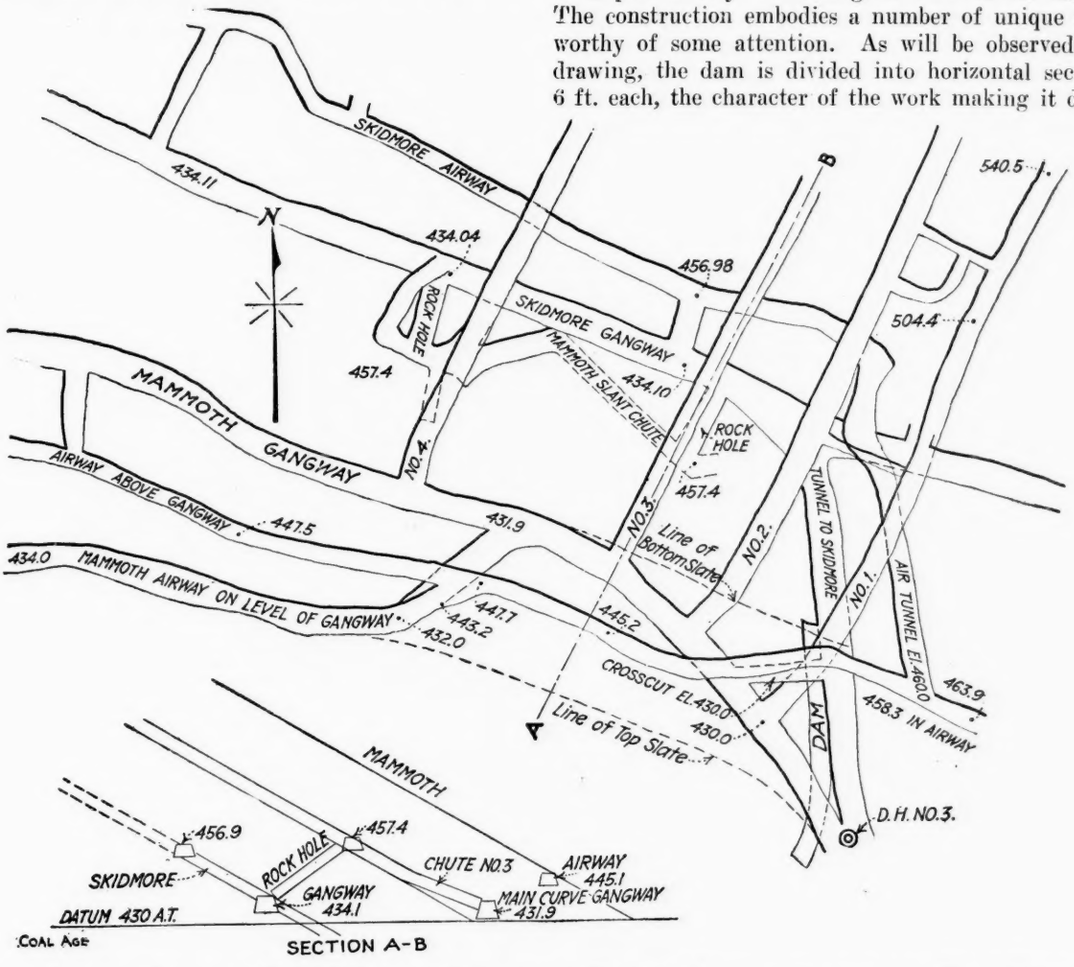
The fire was discovered on Saturday, May 2, and an attempt was made to put it out with an ordinary fire hose. A 2½-in. line was laid in toward the fire, but before it was reached a number of men were overcome and it was necessary to lay the last four lengths with the aid of Draeger helmets, which proved very effective. A second fire line was then established from a pump located at the No. 3 Tunnel from the Mammoth Vein to the Skidmore at the point *C*, noted on the map; 800 ft. of hose was laid through the tunnel, and 750 ft. through the airway and gangway of the Mammoth Vein up to the fire. On Monday, May 4, at 8 p.m., both the fire lines were pouring water on the blaze.

It had become evident by this time that the fire would be exceedingly difficult to handle, and after a conference with the state mine inspectors it was decided to seal it off. Temporary stoppings were accordingly put in on the No. 1 gangway on the Mammoth Vein at the point *D* and also at the point *E* at the connection of the No. 3 North Tunnel with the Mammoth Vein workings. It was at the same time decided to put in concrete dams at the point *F* in the Mammoth Vein workings, and *G* about half way through the No. 3 North Tunnel.

Elaborate Dam Construction

Detail drawings of these dams are shown herewith, and it will be noted that the one designed for use at the point *F* is particularly interesting in view of its large size. The construction embodies a number of unique features worthy of some attention. As will be observed by the drawing, the dam is divided into horizontal sections of 6 ft. each, the character of the work making it desirable to lay each of these sections separately. To secure a firm joint between the different sections, a concrete key about 18x24 in. is provided, together with reinforcements projecting from the top of one section into the base of the next one above.

Since the structure acts as an actual dam only for about 10 ft. of its height, reinforcements against heavy pressure are provided only at this point, as will be noted in the drawing. It will also be observed that it is the intention to concrete the adjoining gangway in which it is proposed to intersperse steel supports between the existing timber sets, which will either be removed or left in, as may seem the most desirable when the concreting begins.

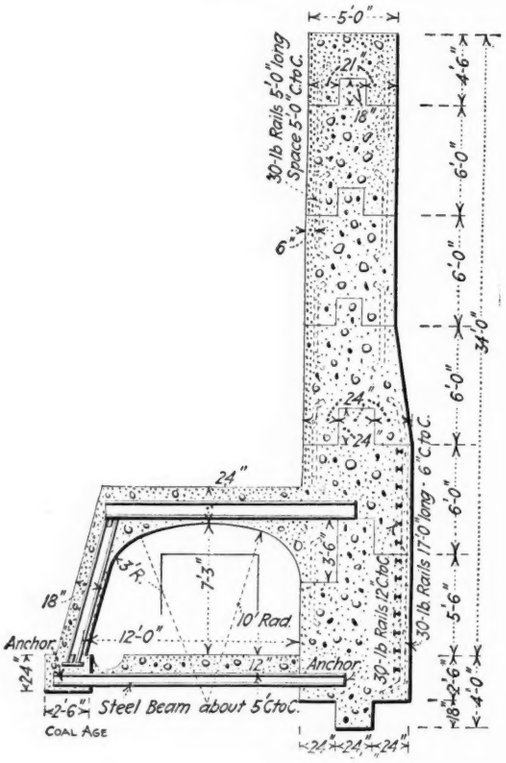


Plan and Section, Showing How Flushing Operations Will Be Conducted from the No. 3 Drill Hole through the Skidmore Vein

The second dam in the No. 3 North Tunnel is relatively small as compared with the one just described, and embodies no unusual features. Provisions will, of course, be made in both dams for obtaining the temperatures behind the structures, together with samples of the gas and any other data that may be necessary.

The Drill Holes

The complete inaccessibility of the fire has, of course, made it necessary for the company to resort to flushing through drill holes from the surface. It is planned to use only three holes, and it is believed that, together with the underground openings, it will be possible to reach all of the affected area. The holes are to be located as shown on the accompanying drawings at Nos. 1, 2 and 3. Nos. 1 and 2 will be 8-in. holes about 800 ft. deep, and No. 3 will be 10-in. in diameter and 890 ft. deep.

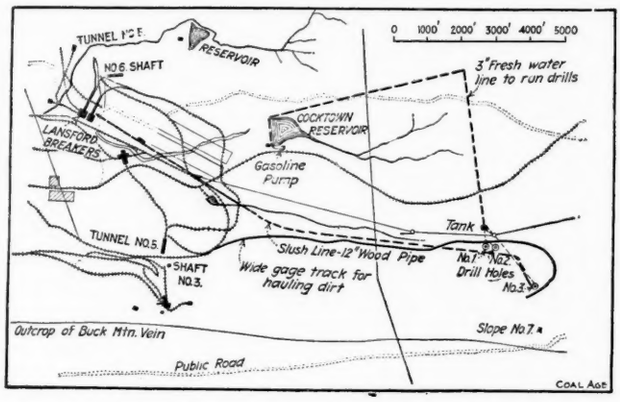


The Main Dam Located at "F"

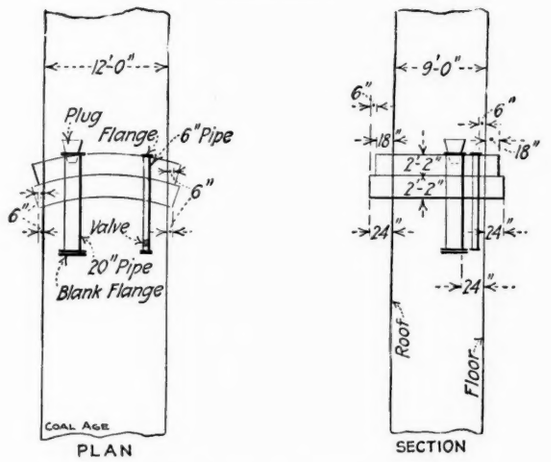
Referring again to the accompanying map, it will be noted that the holes Nos. 1 and 2 are located in the highest portion of the fire territory. It is believed that the flushing material will run out into at least all of the area in the immediate vicinity which is essentially in the center of the fire zone. The area between the large dam at *F* and the fire will be filled through drill hole No. 3. As will be observed, this hole lies outside of the sealed off area, and is therefore accessible under ground. Material from this hole will be conducted by direct pipe connections from the bottom of the hole in through the Skidmore Vein and then by rock tunnels, driven at an angle of 35 deg. up into the Mammoth Vein. A cross-section of these proposed tunnels, and the general location of them, will be found in the accompanying drawings.

Surface Plants

No figures regarding the amount of material that will be required are available but it is obvious that there will be sufficient needed to justify the installation of the most economical methods available. In the accompanying drawing, a rough map of the proposed surface installation is given. It will be observed that this involves the construction of two miles of standard-gage railroad. The



Surface Installations for Flushing and Drilling Operations



Dam in the No. 3 North Tunnel

curvature and grade of this line will be comparatively heavy, but the construction will not involve much work, amounting to little more than barely surfacing the track except for one short stretch where there is a moderate fill in breaking away from the main line.

The material to be flushed will be hauled over this line and washed down the holes by the flush water from the Lansford breaker. The water line from the breaker to the drill hole will be 7600 ft. long, and made up of 14-in. wood pipe, together with whatever miscellaneous pipe is available. This water will be handled by a 42x20x72 single-acting pump manufactured in the local shops; it has a capacity of 1500 gal. per min., and will be working under a 230-ft. head. As will be observed on the drawing, a fresh-water line is provided to supply the drills.

Boilers left full of water while out of service often suffer from external corrosion because the cold surfaces condense the vapor in the air and corrosion is rapid, especially in the presence of the sulphur compounds in soot.—Bromley in "Power."

The Colorado Strike

SYNOPSIS—Further light is being obtained by the public regarding the strike in Colorado. The Industrial Relations Committee has heard a lurid account from Mrs. M. H. Thomas and Mrs. Jolly, a detailed rebuttal of the major part of their charges from Major Boughton and a painfully neurotic plea from Judge Lindsey. Meantime the latter has been unsparingly condemned by local chambers of commerce and others. On the whole it seems that an end of the whole agitation will come if the army of the United States removes all men without occupation who are strikers from the zone of trouble.

The Industrial Relations Committee received a visit on May 27 from Mrs. M. Scott, president of the Women's Trade Union League, who brought with her Mrs. P. Jolly and Mrs. M. H. Thomas, the two women who had accompanied Judge Lindsey to New York City and Washington. Mrs. J. Borden Harriman moved that the women be heard.

Mrs. Jolly testified to the excellent relations existing between militia and "strikers" early in the strike. Apparently this changed when a search was made for arms and ammunition. She declared that the miners' families were forbidden with oaths to go to the post office and that in December, when there was deep snow on the ground they were ordered to leave their tents. When a woman with a sick child in her arms tried to return a revolver was placed at her head.

Probably the report of Major-General Chase throws a clearer light on this event, if Mrs. Jolly's statement refers to the Forbes camp in which Chase declares there were no women and children. Mrs. Jolly declared she pinned red crosses over her white dress and wanted to intercede but "all I got was a bullet through the heel of my shoe."

It is needless after having published the report of Major E. J. Boughton for us to rehearse his testimony. Judge Lindsey spent much of his time denouncing John D. Rockefeller and his Colorado aides. He stated:

"The new feudalism, which deliberately refuses personal relations is only a new and novel system of suicide. The President of the United States should prevent it as a policeman seizes the poor devil who is trying to leap into the river."

The court martial of H. E. Linderfelt has been completed and John Lawson, of the United Mine Workers of America, has testified. As we suspected, Lawson showed himself rather a correct than an interesting witness. He aids and abets rather than violates the law by direct action. He did not try to get to the camp at Ludlow until some time after the fight had begun as he was at Trinidad when he learned of the shooting. He did not succeed in entering the colony, and he left it after a few hours, before the fire took place.

USED A WHITE FLAG TO PROTECT HIM AS HE TRIED TO JOIN HIMSELF TO THE ENEMY

With John Boralich, the union chauffer, and Peter Gorman, he had taken an automobile to go into the colony. He pinned a handkerchief on the front of the automobile and tried under cover of this flag to get among the tents. He was in the same condition as a man who tried to run a blockade under the white flag.

We will grant him that his purpose may have been peaceable and not belligerent, but nevertheless he could not complain if he came under fire. Had he approached, not the camp, but the militia with his white flag, the situation would have been wholly different. In fact the strikers by their own testimony have used the white flag as a means of obtaining improper ends and consequently can hardly claim for it any inviolability. Lawson declared he had no guns in his automobile.

HOISTED A WHITE FLAG TO AID IN ESCAPE

The court has returned its verdict. It is thought that it has stated among other things that Premo Larese was killed while attempting to escape with a horse and buggy from the tent colony under the protection of a white flag. He was called upon to halt and he opened fire with a revolver. It may be true that some men were foolish enough to believe that any act not directly belligerent could be performed with immunity under the white flag, but it is intended to be used for surrender or parley and its use for other purposes needs mutual agreement.

THE MILITIA IS ONLY GUILTY OF TECHNICAL ERRORS

It is further understood that the court finds that the soldiers did not know that there were any women and children remaining in the colony after the battle started, that the 11 children and two women were suffocated by exhaustion of oxygen from the atmosphere within the narow confines of the cave, that all were dead before the fire started and that the Snyder boy was shot in the forehead by a bullet from the guns of the strikers north of the colony when the child ran outside during the battle. Carlo Costa, they are said to declare, was killed at the sandhills by the Colorado & Southeastern R.R. tracks in a battle against the state troops.

It is also said that Sergeant Patrick N. Cullen is criticized for failing to give safe conduct to Louis Tikas and that Privates F. M. Mason and Dan Pacheco are condemned for not living up to the articles of war which require that a guard shall protect a prisoner with his own life if need be.

The people of Colorado generally are much stirred at the condemnation of the militia and with reason. Governor Ammons writing to L. C. Paddock of the Boulder "Daily Camera," says that for almost six months as many as 40 stations were maintained scattered over a territory greater in extent than some states without killing a single "striker."

SECRET ORDERS DEFEND MILITIA

The Ancient and Accepted Scottish Rite Freemasons at Denver, Colo., have adopted a strong endorsement of the militia and framed a defense of its martyrs while recognizing that "in this insurrection, as in all actual warfare, there may have been cases of wrong by individual members of the National Guard of Colorado."

The Junior Order of United American Mechanics, Kensington Council No. 16, Denver, Colo., has also made a strong report defending the state government, its militia and its citizens. It calls attention to several important facts and only fear of repetition keeps us from detailing them. It tells how the militia at Ludlow after the battle, despite the fact that their pay was months in arrears, collected $18 for the suffering women and children. It defends the militia from cowardice and says that there were from 400 to 800 men in the Ludlow attack and only 34 men to meet that mob of blood-thirsty foreign anarchists. What wonder we may add that a roughly collected body of men, mine guards, company men and mine workers, white and black, came down from Aguilar to defend the devoted company of militia thus in danger of extermination.

The Kensington Council likewise states: "The tent colony was purposely so located as to command an unobstructed view of the railway depot near at hand where working men were obliged to get on and off the trains. The conduct of the strikers during the winter was such that it was necessary to send a detail of soldiers to meet every train in order to protect the nonunion men from physical violence."

THOSE WHO WANTED TO WORK WERE IMPRISONED

No man wishing to leave the colony and go to work could do so except under guard of the state troops and during the winter over a hundred men were in this way taken from the tent colony under military guard at their own request.

On Apr. 20, a detail of men was sent in the usual manner to rescue a man who had called for help to get away. This time the man was not given up. Then followed the Ludlow battle which we need not again describe.

Hardly less forceful was the defense of the Cañon City Chamber of Commerce. The respectable citizens of Colorado are certainly beginning to take an interest in politics and are sweeping aside those who have used the vote for the defense of disorder.

OVER A HUNDRED EX-SOLDIERS AT LUDLOW

Speaking at Greely, Colo. Adjutant General Chase said of the Ludlow colonists, "I feel a great compassion for those men. They are ignorant foreigners. To my knowledge, 120 were trained soldiers, fresh from fighting in the Balkans and in Bulgaria. One thousand persons were in that tent colony, 700 men and about 300 women. The troops went to Trinidad in an impartial frame of mind to establish peace and order and it was done under the most trying conditions and the work will ever reflect credit on these students, school teachers, merchants, doctors and lawyers—these men who have been called gunmen.

In eight months the strike has cost from $10,000,000 to $12,000,000. This includes $700,000 expended for the state militia, $6,925,000 spent by the United Mine Workers of America and the millions lost by the operators. The total

tonnage for the first three months of 1914 was 2,817,675 tons against 3,638,436 for the same period a year ago, a decline of 22.5 per cent. only.

THE UNION BURDEN

But Lawson states that 8500 men are on strike, that is, we suppose, are on the payroll of the union. The burden of the strike is immense to that organization and it owes a vote of thanks to the U. S. Army for preventing all the army of unemployed and "won't works" from feinting a desire to work for the companies and getting the financial assistance of the union thereafter.

ATTACK ON U. S. TROOPS

The militia secured peace for six months, and also, by the way, 1947 guns acording to Adjutant General Chase. It is doubted whether the U. S. troops will do much better. At the village of Segundo in Los Animas County, near the southern state line, a U. S. soldier on May 26 had to dodge a missile thrown from the window of a scale house. He was also fired at and returned the fire. More than 20 shots were then fired on the military patrol from a hillside overlooking the camp by the gunmen of the "strikers." There has been much picketing and eight men who had been working at Sopris were prevented from boarding an interurban car for that place.

William Diamond, of the United Mine Workers of America, has announced that a number of eastern organizers will be brought into Colorado from the East. Col. Locket, of the U. S. Army, is considering whether this will be allowed.

THE LEGISLATIVE COMMITTEE

The legislative mediation committee, so called, is in doubt whether it is empowered to do any more than investigate and has finally decided that it will make an investigation and how it will be done. Senators Pierson and Stephan go to Routt County, Representatives Smedley and Wright to Boulder and Weld counties, and Senator Burris and Representative Fincher to the southern coal fields. This decision was reached May 27. It is thought the trips will take about a week or 10 days.

It is not necessary to specify in detail the action of the grand jury at Trinidad and Cañon City in the indictment of the men who were engaged in attacking the mines at Forbes and Chandler. One hundred men were indicted for the latter offense.

PROFIT SHARING AND SOCIALISM

Brilliant suggestions for ending the strike are that the Union shall open mines and operate them, making them absolutely safe and surrounding them with dwellings of a superior order. The profits can be divided among the working men who will be stockholders. The Union was urged to do this by Governor Ammons long ago, but no reply was made to his proposal. The experiments made in Wyoming by workingmen who opened mines, and perhaps in Colorado also, do not hold out much assurance of success.

The Coal Consumers' Legislative League desires to meet the problem with an amendment to the constitution by which the state board of land commissioners may open mines, extract and sell coal, paying 10c. into the school fund and another 10c. toward the amortization of the debt incurred, the bonds not to exceed $500,000.

FORBES MINE PERMITTED TO RESUME

The Forbes mine resumed operations May 25 with 95 men who were working there before the attack was made on that operation Apr. 29. On that date, the tipple, mine office and other buildings were burned and nine persons killed. The commander of the troops in that locality does not object to the mines reopening, provided no new men are brought in to replace those murdered and driven away by force of arms. Benignity supreme!

More Anthracite Articles to Come

We have been able to print only a part of the anthracite articles that were submitted by our contributors for publication in our issue this week. Other interesting matter relative to hard-coal mining will apear next week, and in succeeding numbers of COAL AGE. We are sure our readers will find the articles of Messrs. Conner and Warren so interesting and instructive that they will not find fault with us for devoting so much space to them.

Gas in Anthracite Mines

BY W. D. OWENS.*

In connection with anthracite mining, I want to call attention to a fact that it seems to me is much overlooked, or to which proper credit is not commonly given. We often hear the statement made that there is generally more gas in bituminous coal mines than is to be found in anthracite workings.

I believe that this idea, which is contrary to my own experience, can be attributed largely to the teaching of geologists and scientists that anthracite was originally in a state similar to that of bituminous coal; and that, for a long period of time, these deposits were subjected to the modifying influences of great heat and pressure. The inference is natural that this great heat, which suggests to one's mind a condition similar to what might exist in the vicinity of a volcano, would drive all the gases out of the coal in the same manner that we know the gases are driven off from bituminous coal by heat.

Another fact hard to understand is how it happens that anthracite contains, on the average, only about one-half the amount of ash usually found in bituminous coal. It would seem that if anthracite was formed from bituminous coal by the action of great heat, not only would the gases be driven from the coal, but the percentage of ash in the anthracite might be expected to be much higher than that in bituminous coal.

From these well-established facts of science, it seems difficult to understand or explain the presence of so large a quantity of gas as is found in many anthracite districts. I have had a wide experience in the mining of many different grades of coal, in different parts of the world. For 20 years, I was engaged in mining coal in Wales, in the Bryndu colliery, Kenffig, South Wales, which was considered a very gaseous mine. The coal was entirely bituminous, and the Gribbwr seam was considered the best coal to be obtained in the British Isles, for coking purposes. Following this, I worked in the Morva colliery, near Aberavon, where the coal was of the same quality; and, later, in the Park colliery, Britoin Ferry, South Wales. The coal here was also bituminous, but the seams were thinner and on a heavy pitch. Again, I was employed in the Bwllva colliery, Aberdare, where the coal was semibituminous and worked on the longwall system. I worked for a time in the celebrated Ferndale colliery, where 181 men were killed, in the last explosion in that mine; and, again, in collieries in the upper end of the Rhondda Valley. Practically all of these mines were gaseous mines.

Coming to this country at the age of 31, my experience has since been confined to the mining of anthracite coal. As far as I have been able to discover, the mines of the anthracite valley, particularly those of the Wyoming Valley, Luzerne County, Penn., extending from a point near Pittston to Nanticoke, contained more gas than I ever saw in any bituminous or semibituminous mine. I recall an instance of 21 years ago, where the volume of air circulating in the mine was 181,000 cu.ft. per min., and a test with the Davy lamp, at the foot of the upcast shaft, gave a cap from ¼ to ⅜ in. on a ¼-in. flame. When it is remembered that a ¼-in. cap on a flame of the same height indicates about 2 per cent.

*Div. Supt., The Lehigh Valley Coal Co., Wilkes-Barre, Penn.

of gas in the current, it is readily seen that this mine was generating between 3000 and 4000 cu.ft. of gas per min.

The above is only one of many similar cases existing in the mines about Wilkes-Barre. There are many mines here circulating nearly 500,000 cu.ft. of air per min., and I doubt if similar conditions, in respect to gas, can be shown in any bituminous mine, in this country or elsewhere. I know that the same conditions do not hold in all anthracite beds, for the anthracite mines of Wales had little gas, at least as far as the development had gone at the time I was there. If bituminous workings can show more gas generated in the mines than that just mentioned in regard to anthracite mines, I would personally much appreciate learning the facts.

❖

An Interesting Anthracite Development

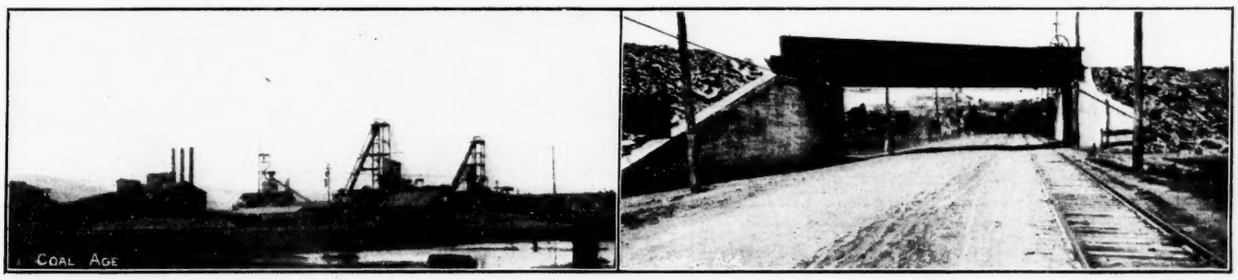
One of the most interesting small developments, at present going on in the anthracite region, is to be found a short distance above Wilkes-Barre. Here, the Delaware, Lackawanna & Western R.R. Co. is developing a small tract, about 130 acres, of isolated coal land.

Hoisting in the two shafts above mentioned will be accomplished by means of steam hoisting engines, which will be duplicates of each other. Ventilation will be secured through two duplicate fans of the narrow-vane type.

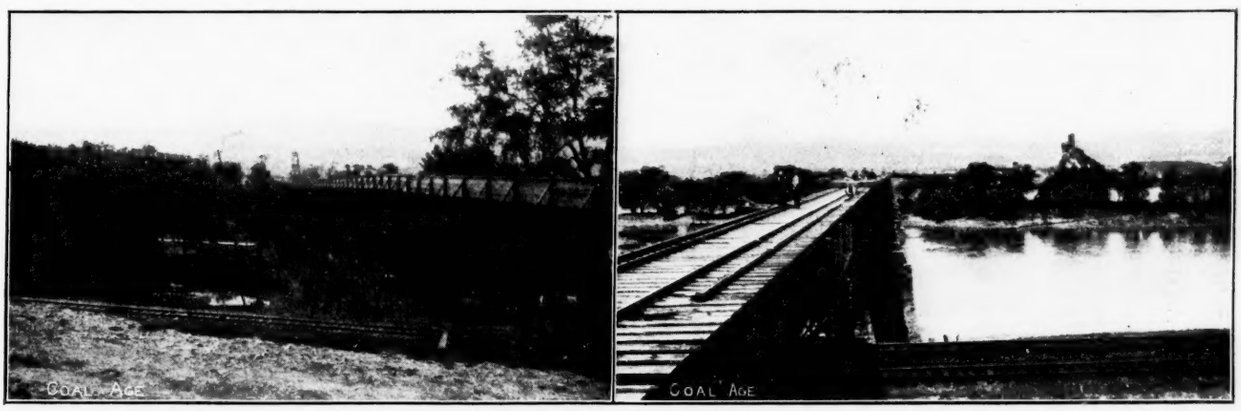
It is not at the mine itself, however, that the chief interest in this development centers, but in the fact that the coal will not be prepared in the vicinity of the shaft. The entire output of this mine will be hauled approximately two miles and preparation made at the Pettebone breaker.

The tramroad connecting the mine with the breaker presents many engineering difficulties. Considerable grading has had to be done and at least five bridges varying in length from those sufficiently long to carry the track over streets and street-car lines to one which spans the Susquehanna River must be traversed. A steel trestle several hundred feet in length is employed to carry the track across a small brook and the low flat lands upon either side of it. Another bridge spans six tracks of the Lehigh Valley Railroad.

Across the Susquehanna River the tramroad will be carried on arms from the trusses of the old Wilkes-Barre & Eastern R.R. (now the Delaware & Hudson) bridge.



TEMPORARY HEAD WORKS AT THE SHAFTS AND ONE OF THE BRIDGES SPANNING A STREET AND TROLLEY LINE



STEEL TRESTLE ACROSS BROOK AND FLAT, AND THE BRIDGE ACROSS THE SUSQUEHANNA RIVER WITH THE PETTEBONE BREAKER IN THE DISTANCE

Two shafts are being sunk upon this property, one for hoisting the coal and the other as an air shaft. The latter contains two cage compartments for the accommodation of men and material, one airway and a compartment for pipes and electric conductors. At the present time, these shafts are down to a depth of about 630 ft. The hoist shaft will eventually be continued to 1150 ft., while the air shaft will only be driven as far as the Baltimore seam, and the lower measures reached therefrom by means of slopes.

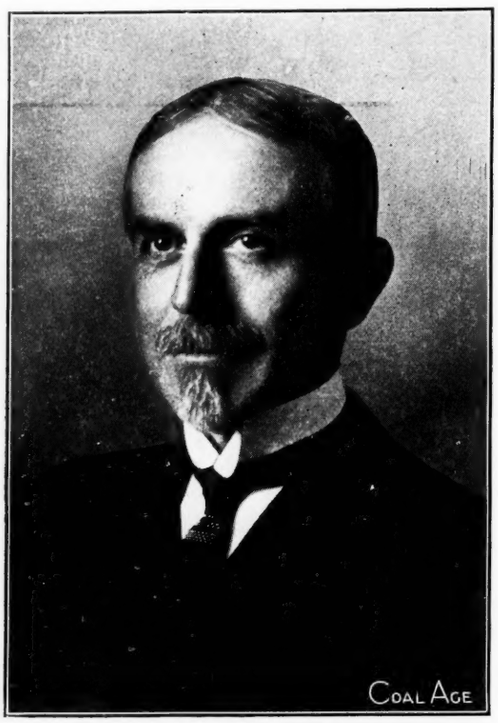
Although this bridge is an old structure much repair work was necessary to put it in shape for operation. Beyond the river proper, a considerable length of steel trestling is required before the road reaches the Pettebone breaker.

Although in many places in the coal fields the product of the mine must be hauled long distances before being placed in railroad cars, it is seldom indeed that such hauls present so many engineering problems and difficulties as does the one just described.

Who's Who in Coal Mining

Frederick E. Zerby

One of the most interesting men in the anthracite field is Fred Zerby, general manager of the Kingston Coal Co., Kingston, Penn. He is rich in original ideas, and in spite of his love of precision and insistence on details, he possesses to a remarkable degree that most admirable quality "humanity." Many mine managers are so engrossed in the work they are carrying on, and the attainment of their company's success, that they are unable to stoop low enough to see and feel with the hundreds of men in their employ. Mr. Zerby, however, has the happy faculty of being able to place himself in the other fellow's position, and this, more than anything else, accounts for his success.



FREDERICK E. ZERBY

Standing less than 5 ft. 7 in., stockily and proportionately built, with keen black eyes looking out from under heavy brows, Fred Zerby appears to be just what he actually is—a bundle of nerves—a dynamo of human energy. He is a tireless worker and an enthusiastic student of mining.

Mr. Zerby can be persuaded to talk about almost anything except himself; however, it is a fact that his first important experience in mining was secured with the Lehigh Valley Coal Co., where he was appointed superintendent of mines in the Hazleton division. Later he was transferred to Wilkes-Barre, and became superintendent of the same company's Wyoming division. When the late Robert Mercur died, the Kingston Coal Co., looking about for a suitable man to manage their collieries, settled upon Mr. Zerby, offering him the position, which he finally accepted.

The Kingston company, with several collieries in Edwardsville and one in Plymouth, under Mr. Zerby's supervision has become one of the most successful of the independent mining concerns. In his work of bettering conditions for his employees, he has erected modern homes to replace shanties formerly occupied by many of the Kingston miners. Culm banks have been removed, and in their place he has put in splendidly equipped playgrounds. Night schools have been established for the young and old, and a company band has been organized for musical entertainment. Libraries have been created and hospitals erected.

All of these improvements have been made at the company's expense, therefore it is not hard to understand why the miners of the Edwardsville section speak of Fred Zerby as the best general manager the Kingston Coal Co. ever had. It is doubtful if any mining concern in the anthracite field can boast a more loyal army of workmen than the corporation at present managed by Mr. Zerby.

John C. Haddock

We have all heard so much about self-made men that any writer using the expression must feel some trepidation. However, if there is any merit in a man's advance toward success over serious obstacles, and without the aid of helping hands, John Haddock is surely worthy of mention.

As an independent operator and president of the Plymouth Coal Co., he is reckoned as a force throughout the mining districts of the Pennsylvania anthracite field. Few men possess more dogged determination and are less compromising in battle than Mr. Haddock.

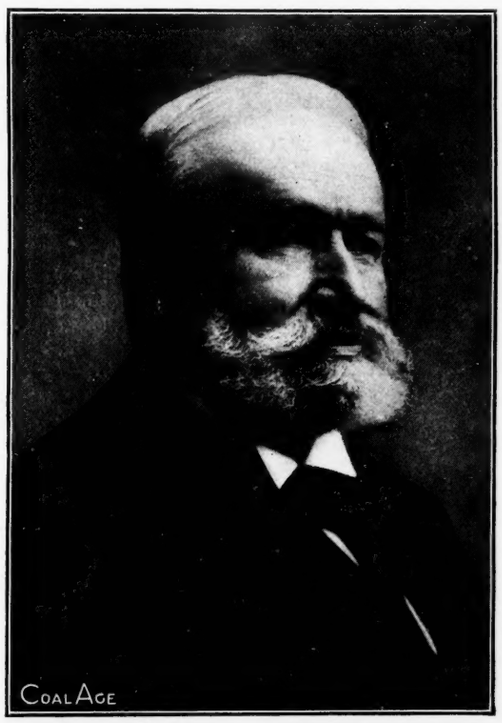
Not many men in his employ, even if younger in years, can stand the pace he sets in his business life. His work is his recreation. In summer or winter, early and late, he will be found toiling away, without any apparent relaxation from the strain of his labors. Mr. Haddock was born in the north of Ireland, County Longsford, 1850. When an infant in arms, he was brought by his parents to the shores of America, and for 11 years lived in Lenox, Mass.

His first job was that of an errand boy for a commercial house in Newport, R. I. His salary was $2 per week. After 18 months of this work, he became a clerk in a wholesale grocery store and held this position for one year. Then came a chance for him to connect himself with the wholesale and retail coal business, and in 1871 he was sent to Fall River, Mass., to take charge of a coal business in that town. In 1874 he went to New York to become manager of Meeker & Dean, wholesale coal dealers.

In 1877, Mr. Haddock decided to set out for himself, and one year later he took over the lease of the Dodson mine at Plymouth, Penn. He successfully operated this

colliery until 1882, when he branched out and, with Charles S. Steel as partner, took over the lease of the Black Diamond mine in Luzerne, Penn., consolidating this latter property with the Plymouth colliery to form the Plymouth Coal Co.

As early as 1890, he started an agitation for the regulation of the supply of coal cars. He discussed the matter with many of the big railroads, and not feeling satisfied with conditions as they stood, he asserted public-



JOHN C. HADDOCK

ly that the railroads were discriminating against the independent operators. His contention was that the discrimination was not only a hardship on the smaller operators, but on the men who worked for them.

He then began a systematic study of this big question, and while his attack for improved conditions was directed only at the D., L. & W. Co., the contest was really one of far-reaching effect.

As a result of this fight, led by Mr. Haddock and several other independent coal men in the anthracite field, discrimination on the part of the coal railroads against the small operators apparently ceased, and the little fellows were given equal rights in the matter of coal transportation and the distribution of cars.

And Mr. Haddock's entire attention has not been devoted exclusively to purely corporation matters, forgetting the men who have made possible his success. It was through the instrumentality of his personal efforts that the Plymouth Coal Co. established a tax on its own coal to create a benefit fund for employees, made dependent on the company through mine accidents.

The boiler and the furnace are twin brothers, but they must be regarded as independent units and their efficiency separately considered. Though the boiler may be perfect, the furnace may be most inefficient. In fact, it usually is, as it is generally erected by ordinary bricklayers who are not superintended by specialists.

Industrial Peace Increases Efficiency of Miners

With the coming of industrial peace in the anthracite region of Pennsylvania has come greater efficiency among the miners and more production of coal per man. With the greater efficiency has come increased earning power, as the miners are paid for the coal they produce.

When the breakers are not running it is useless for the miners to cut coal, so the only way to arrive at a right and just estimate of their efficiency is to divide the annual output of the mines by the product of the number of miners employed and the number of breaker days. The result of this calculation, based on the figures in the last Report of the Bureau of Mines, is as follows:

Year	No. of Miners Employed	Average No. of Days Worked	Total Miners' Working Days	Output in Tons	Average Production Per Miner Per Day
1901	37,804	195	7,371,780	59,905,951	8.13
1902	36,392	116	4,221,472	36,911,549	8.74
1903	36,823	211	7,769,653	67,171,951	8.64
1904	39,848	213	8,487,624	65,709,258	7.74
1905	42,078	208	8,752,224	70,220,554	8.02
1906	41,801	206	8,611,006	64,410,277	7.48
1907	43,035	227	9,768,945	76,836,082	7.86
1908	44,340	211	9,355,740	74,592,181	7.97
1909	44,675	205	9,158,375	71,628,422	7.82
1910	43,651	212	9,254,012	74,717,852	8.07
1911	45,324	234	10,605,816	81,176,050	7.65
1912	44,696	220	9,833,120	84,426,869	8.58

Thus the miners are producing nearly as much coal per man per day as they were a decade ago, when the veins were larger and the mining easier. Owing to the suspension in the summer of 1912, the number of working days that year was less than in the previous year. In spite of this fact and the fact that fewer miners were employed, the production increased from 81,176,050 to 84,426,869 tons, and the average production per miner per day increased by nearly a ton. This implies an increase in efficiency of over 40,000 tons a day, and is a strong argument in favor of industrial peace, which benefits employer and employee alike.

Few Accidents in the Smokeless Mines

The records of the West Virginia State Mining Department, which have just been made public by Earl A. Henry, chief inspector, show that in the month of April there were 31 fatal accidents in the coal mines of West Virginia. This is a gain over the previous month.

The deaths resulting from the explosion in mine No. 5, at Eccles, West Virginia, are considered apart from the regular casualty list of the month because a disaster like that at Eccles always stands out by itself. In the Eccles mine there were 180 deaths, and this brings the total up to 211 for the month. Of the 31 deaths in the state, only seven occurred in those counties where smokeless coal, for which West Virginia is celebrated, is mined.

A classification of the list shows that 16 of the 31 were due to carelessness on the part of the miners, and these miners paid with their lives for the violation of the state mining laws and rules governing their particular mines. Of the 31 deaths, 20 were due to falls of coal and slate; five were caused by mine cars; two to electrocution; one by mining machine and four for miscellaneous causes. Of those under this latter classification, one man was kicked to death by a mule, another was crushed by a lump of coal falling off a railroad car at the tipple, and a third fell from a scaffold.

Editorials

The Strikes of 1902 and 1914

We prefer not to discuss a man with political affiliations like Colonel Roosevelt and we would urgently contend that coal has nothing to do with politics, if politics would cease meddling with coal. But it will not.

The public, rarely surprised at any action of Colonel Roosevelt, was temporarily taken aback at his declaration made recently in the suit of A. D. Wales against John Mitchell and the United Mine Workers of America, that he had proposed to create a pretext and invade the State of Pennsylvania with the United States Army.

It was all arranged, he said, that he was to give word to Matthew S. Quay and that not overscrupulous politician was to notify Governor Stone, who in his turn was to declare that he could not maintain order, and then the invasion was to take place.

Now order was being maintained and a declaration on Stone's part that it was not would have been little other than treasonable. That Roosevelt could so contrive and acknowledge his contrivance is evidence that he has a Machiavellian hand even if his intentions are of the best. Roosevelt's declaration was that he intended to send Major-General Schofield to seize the mines and operate them, ordering him to ignore the writs, injunctions or legal papers of any court and take his orders solely from the President.

Conditions are changing extremely fast, and to illustrate the change of sentiment, we recall an incident in the life of another man who later became President. He has been regarded as the personification of energy like Roosevelt but his actions were very different.

The President to whom we refer was Andrew Jackson. The war with Great Britain was barely at an end and General Jackson had reason for doubting whether peace had been consummated. A man named Louaillier had been tried in the civil courts for being a spy and had been acquitted. Andrew Jackson held him by martial law and expelled Judge Hall, who issued a writ of habeas corpus for Louaillier from the city of New Orleans, ordering him not to return till notice was properly posted or until the enemy had left the coast. The report of peace was, however, confirmed the following morning and Jackson revoked the martial law and freed his prisoner.

The judge returned and summoned Jackson before him and fined him $1000 and would have been mobbed by friends of the defendant had not Jackson intervened. The future President paid his fine, which in view of his services to the nation was not accompanied by an order for his imprisonment. The threat of Roosevelt in peace is in sharp contrast with Jackson's readiness to acknowledge the civil courts even in war.

Why did Roosevelt take so extreme a position? Because the business of the nation was severely crippled by the want of coal. The services of the coal operators and coal workers are so important that the people feel those services cannot be discontinued for any extended time.

Because the coal operator has put his money into a service of the people of more than ordinary value, his rights and his profits must be curtailed. There is no honor in serving the public. Only those whose work can be dispensed with are free from the continued harrying of the press and the man on the street. Their profits may be unrighteous, especially if the concerns are small, their dealings may be arbitrary, their product may be inferior, nevertheless, the public has nothing to say. But the coal and transportation businesses are not of that class. Because these industries really serve, therefore they must be eternally chidden.

It is remarkable how few are the millionaires in the coal business, and those you see are perhaps as little a part of the trade as the vultures which prey on the combatants are a part of a Mexican battle. These few rich coal barons have made their money not in producing coal but in leasing and selling coal lands and promoting corporations. Those operators who have money have usually made it in some side line and lost money in coal. Several are in the banking business and many were well-to-do before they learned how unsafe an investment productive development of coal land always proves.

It is interesting to note how the public has been prepared to connect the Colorado situation with Roosevelt's proposed action in the anthracite strike of 1902. In that strike, disorder was to be only the excuse; need for coal was the real cause. In Colorado, the actuating motive would be or will be disorder, for no shortage of coal exists.

The crime which is now in commission is not a coal dearth but a shortage of market. We would suggest that Major-General Leonard Wood be required to take charge of all the idle coal-consuming plants so that the coal operators may be furnished with work. Especially those manufacturers might be made to operate their factories who whimpered so childishly when the strike was in progress. This suggestion, made in jest, is not less logical than that proposed by the ex-President.

Explosibility of Coal Dust

It is seldom that readers are interested in controversies between editors, especially if the argument is based on intentional misrepresentation. Recently we were criticized for publishing a few statements from the findings of the Explosions in Mines Committee of Great Britain. An attempt was made to credit COAL AGE with the authorship of conclusions that resulted from the British experiments. It is the business of a paper to give all the news, providing the source is reliable. To question the competency or responsibility of Messrs. Cunynghame, Redmayne, Desborough, Dixon and Blackett is to insult the intelligence of coal-mining people everywhere.

Anyone interested in the question of the explosibility of anthracite dust will be interested in reading the remarks of Mr. Verner on p. 897 of COAL AGE last week. He emphasizes a point that has only been overlooked by

the careless reader; namely, that *"the inflammation of dust* and the *violence of the explosion* are two different propositions."

Everyone knows that anthracite dust is difficult to inflame; therefore, the freedom of anthracite mines from dust explosions.

Bearing on this subject, we will *quote* another part of a report of the same British committee referred to above. They say:

> The idea seems to have been prevalent that the percentage of volatile constituents that a particular coal dust contains is a direct measure of the explosive properties of that dust.
>
> The explanation usually given for this assumption is that the gases derived by distillation of the dust by the source of ignition are the real agents in propagating combustion. According to this view, distillation of inflammable gas must first take place, and it is that gas mixing with air that forms the "explosive mixture." Hence it is concluded that any dust which yields only a small proportion of inflammable gas on heating, or from which the gases are driven off with difficulty, should give only moderate explosive effects; and a dust that yields no gas at all should, according to this view, be incapable of propagating explosion.
>
> **Neither of these two assumptions is upheld by experiment. A coal dust containing 16 per cent. of "volatile matter" caused an explosion as violent as one containing 35 per cent., whilst wood charcoal produced an explosion as great, or even greater.**
>
> In our view there is nothing to conflict with the belief that coal dust, when suspended in a sufficiently finely divided state in air, acts somewhat like a "coarse" gas, the aggregate of molecules contained in the one particle of dust corresponding to the single molecule that takes part in an explosion of a combustible gas and air, the heat energy necessary for propagation of explosion being derived from combustion of each dust particle as a whole without any appreciable preliminary distillation of gas therefrom In other words, heated oxygen molecules coming into collision with the combustible dust particles form highly-heated carbon dioxide and steam molecules, which in turn transfer their energy, directly or indirectly, to other oxygen molecules and unburnt dust particles and so propagate the flame
>
> **According to this view, any finely-divided dust that is capable of being burnt is capable of propagating explosion.**
>
> Many considerations favor this opinion. The rapidity with which explosive combustion (as distinct from inflammation) is propagated in coal dust and air mixtures is hardly compatible with the notion that distillation of gas must necessarily first take place, and that it is the heat-energy derived from the combustion of that gas which is chiefly responsible for the explosive effects. Such a distillation requires an appreciable time and absorbs energy.

All the foregoing is interesting, and coming from men who are leaders of thought—so far as coal mining is concerned—is worthy of careful consideration. It might be well for the Bureau of Mines to pursue experiments along the lines naturally suggested by the eminent British engineers.

It seems unnecessary to suggest that the conclusions cited are not original with us, and are neither indorsed nor denied by COAL AGE. They are open to discussion and further investigation. We also apologize if we have unnecessarily wasted a word of valuable space in a seeming reply to our critics. At least, we will not use our ink to print veiled insinuations and self-emulation. Honesty, modesty and manners are as becoming in a paper as in an individual.

A Matter of Names

What a thing is named, it often becomes and we cannot afford to disregard the importance of care in nomenclature. We have for a long time labored hard to find names to fit the Colorado situation and cannot say that we have been markedly successful.

To begin with, can we call the difficulty in Colorado a "strike?" James Dalrymple, the state coal-mine inspector, who is a union man and strongly in favor of the miners in all their clashes with the coal companies, who would, we think, be the first to resent any suggestion that he is not a labor sympathizer, states that in the first three months of 1914 there were an average of 10,149 miners working in Colorado mines compared with 14,035 for the same period in 1913, and that there were in September of last year, when the strike was called, 12,346 men. Thus the companies have lost, balancing losses with gains, since the strike was called, only about 18 per cent. of the men, though for a while, in October, 1913, the number of men employed fell to 7,696.

But even more have we felt troubled about calling the Ludlow men and the persons who created the reign of terror in Colorado, "strikers." It is certain that many of those men had never worked in the Colorado mines, perhaps were not mine workers at all, and some who were miners were not employed in Colorado when the strike commenced. In the Ludlow colony, we are told, 120 men were Balkan soldiers, fresh from the war.

It was only on July 16, 1913, that the Roumanians took the field against the Bulgarians in Europe and that the Greeks routed the Bulgars near the frontier. On the 20th of that month, Adrianople was retaken by the Turks. Not until Sept. 15 did Turkey and Bulgaria agree on the frontier question. The disbanding of the troops in all the Balkan states was quite slow.

We mention these facts to show that the large number of Greeks, Bulgars, Serbs and Montenegrins who went over to take part in the war must have returned with others of their compatriots after the strike and some of them were undoubtedly induced by the union to refrain from work and to war for the strikers.

We do not blame the union for hiring these men, if only they had not armed them; it was a good play on their part to agree to keep these men in idleness by strike pay and to endeavor to keep this and other labor from the mines. Had it been done without violence, no one could object. But it is wrong to regard these men as strikers, and the United States Army recognizes that fact by keeping them out of Ludlow. In very truth it might be more correct to term them the gunmen of the strikers, as it is correct also so to designate those outsiders who, scenting battle from afar, like Mother Jones and some Wyoming undesirables, came in of their own accord to aid in the fray.

And again the Ludlow battle, variously termed a "massacre" and an attack on a camp, was really rather a rout of the so-called strikers' forces following an attack on the militia.

These definitive statements are necessary that the reader may understand the Colorado situation, which has been beclouded to some extent by both parties. The operators have not desired to acknowledge unnecessarily the presence of mine guards and mine employees with the militia at Ludlow for fear of a misapprehension of the causes which demanded the employment of the former and rendered natural the action of the latter. On the other hand, the miners did not wish to admit that the Ludlow camp was full of gunmen and non-strikers, was in fact a perfect Alsatia for men of undesirable character.

The opponents of the coal companies have used language which cannot fail to befog the issue and the purpose of this editorial is reached if the difficulties involved in making a precise statement are made manifest.

Sociological Department

The Edwardsville Improvements

By Special Correspondence

Social inequality has everywhere, the wide world over, been the mother of discontent. It has been the unspanned abyss, which, perhaps as much as any single thing, has driven capital and labor apart. There has been a constant movement on the part of deep thinking and big-hearted men to bring capital and labor in closer relationship. And the effort has been a success in no small degree.

Students of the social question long ago discovered that one of the chief obstacles to overcome was to convince the laboring man that he was an important part in the machinery by which the world operates. This has been no easy task, for as a matter of fact the man who has lived by the sweat of his brow and whose existence has been very much of the hand-to-mouth order has been slow to appreciate that he was placed on earth with an object in view. It has been difficult, even in communities where social conditions were of the very best, to make the toiler realize that best results could only be obtained when he coöperated with capital, that the success and happiness of everyone depended in part on the work he did and how that work was done.

On the other hand, the world has had its rich and arrogant men, its industrial rulers who could see in their less fortunate brothers nothing but a duty to serve. There have been men high in the ranks of the industrial world who refused to come half way or even start the journey which would bring employer and employee in better and more brotherly relationship.

No industrial field of the universe has offered better conditions for a study of the social problem than the anthracite coal fields of Pennsylvania. And there the work is still in an experimental stage—yet so highly developed that its success is not for a moment doubted. Many of the coal-mining leaders—captains of industry in their line—have in late years made a deep and serious study of social conditions in the heart of the hard coal fields. And the transformation they have wrought is little short of wonderful.

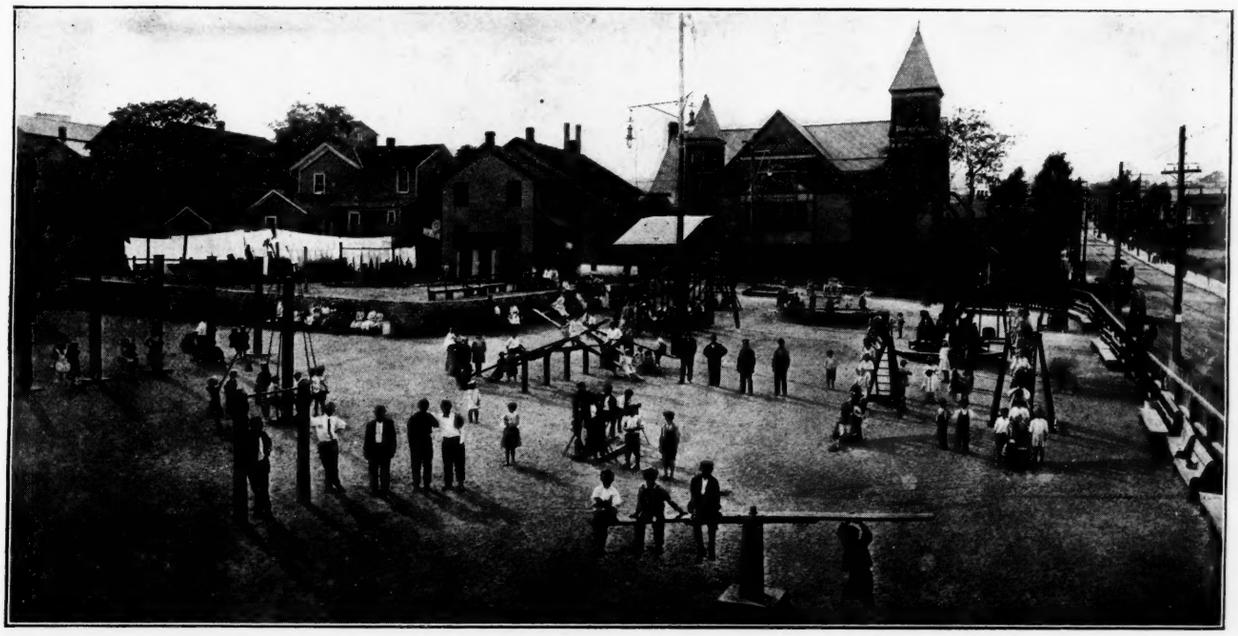
The Old Edwardsville

Edwardsville, Luzerne County, Penn., is a community of about 7000 people, situated not far from Wilkes-Barre.

Eight years ago Edwardsville and much of the surrounding territory was a dirt speck on the coal map of Pennsylvania. Civic pride had never been fostered and in fact little considered. One out of every twenty-five property owners was his own gardener and landscape artist. The rest were mere human beings content to live in fairly clean environments with little hope or desire of ever making their village more than a mining "patch." The greater part of the male inhabitants found employment in the mines of the Kingston Coal Co., an independent concern, which operates four shafts, a few slopes and several tunnels in Edwardsville and surrounding territory.

Dust from the large breakers which this company owned spread over the entire town, giving it a grim and ugly coloring. Huge culm banks reared themselves in the midst of the village and behind and along the sides of these sprung up whitewashed "patches" in which miners and their families made their homes. There

Recreations Center and Modern Houses Built by Kingston Coal Co., to Reclaim a Waste Area, at Edwardsville, Penn.



PLAYGROUND NO. 1, ON MAIN STREET, BUILT AND MAINTAINED BY THE KINGSTON COAL CO., AT EDWARDSVILLE, PENN.

were no lawns nor shade trees. The yards of the tenants were the grazing grounds of goats and about anything else that cared to run loose. Coal company property was used for junk heaps and all the refuse of the towns and the company was dumped on it.

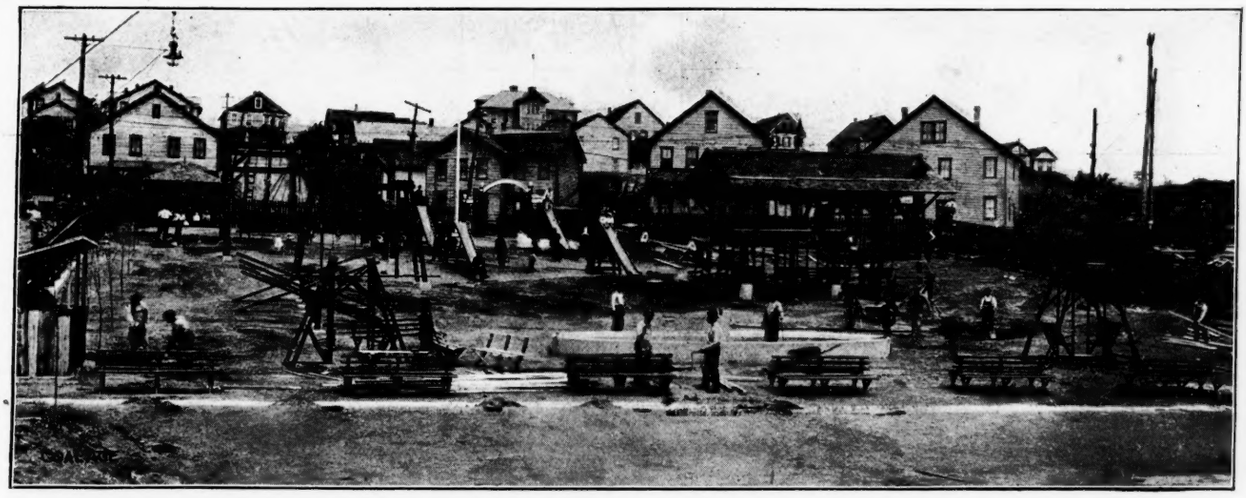
The aim of the company was to produce as much coal as possible without regard to sanitation or comfort. Sidewalks, trees and lawns were unknown things and the need for them still unfelt. There was no attempt to provide sanitary conditions either in the town or on company property.

The colliery boss was invariably the czar of the town—a bigger man than the burgess or any of the borough officials. Employee and employer were far apart and the workmen had not learned their responsibility for the conditions existing. The gap between labor and capital was then very wide.

THE NEW TOWN

But that was eight years ago. Today conditions are much changed, because there came in the town one man who believed that social inequality was the cause of great discontent, and, in fact, great suffering in the community which several thousand miners called their home. That was Frederick E. Zerby, who, small in stature, has a large conception of his opportunities and duties. Eight years ago he became general manager of the company and in that short period of eight years the town of Edwardsville has been wonderfully transformed, and today is fast becoming a town of beauty—no more an eyesore on the landscape of the Wyoming Valley.

There has been method and system to everything that Mr. Zerby has done. It took him a year or so to surround himself with a corps of workers who could assimilate his ideas and work out to perfection the plans he



SHOWING EQUIPMENT OF PLAYGROUNDS, AT EDWARDSVILLE

had in view. For a time it was slow, tedious work. When he set about his task the miners of his company regarded him as just another of the company officials who had come to rule over them—another official who had come to guard the coffers of the company and see that not a dollar of the company's money was spent imprudently.

Frederick E. Zerby is perhaps one of the most socialistic captains of the mines in the anthracite field. He justly and wisely thinks that a part of the dividends earned by the toilers should be returned to them in the bettering of their conditions and to make their lives happier. At the outset Mr. Zerby had a fight on his hands. The men did not understand him and the prying loose of money from the treasury of the company did not please the financiers. But he won out in both cases. He convinced the men to whom he was responsible that they were entitled to a fair and generous dividend on the money they had invested, and he likewise was able to make them see that by bringing employer and employee into closer relationship both sides would fare better.

Not many months elapsed before the name Zerby began to be a household word, and his bigness of heart, his concern of others, began to make itself felt. The men who had regarded high officials of the company as bosses were forced to see that in Mr. Zerby they had another type of man.

Cleaning Up the Company Town

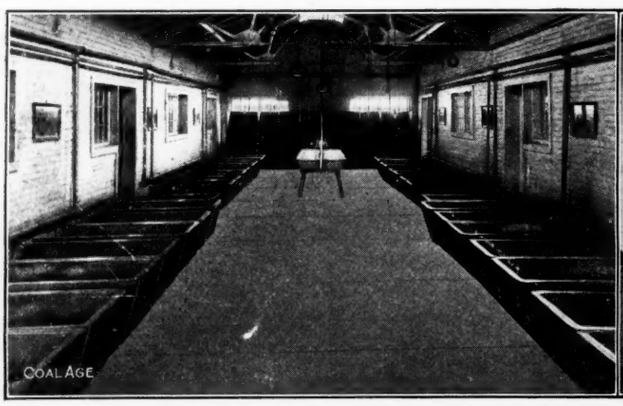
His first attention was directed to company property. He ordered a general cleanup, and in a short time the land in close proximity to the coal breakers began to take on a respectable appearance. Here and there little patches of lawn were sown and shade trees were set out and it was startling to the people of the town what wonderful things nature can do with a little help and a little encouragement. Then came the awakening of a civic pride, and men and women joined hands with the Kingston Coal Co. in a thorough cleanup. This good work has gone on incessantly ever since that time.

Improved conditions about the collieries made the men understand that they were appreciated after all. Mr. Zerby mingled with them, got some of their ideas and systematically began to make the people in general understand that he was not their boss but their friend. And a neglected people are quick to catch any such idea. Their comprehension of his motives began the bridging of the chasm of social inequality.

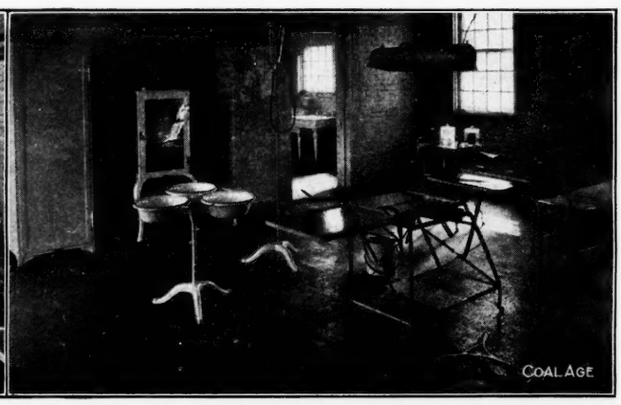
Playgrounds

Finally Mr. Zerby got help from his backers in the company and sent a force of men to a company plot in the center of Edwardsville to transform it into a park. For days and weeks a force of men were kept at this place. Old fences and shanties which had marred the view were razed and the ground was nicely leveled. Concrete walks and walls began to make their appearance. Gradually hand-ball courts, swings, band-stands, fountains, settees and other equipment were erected. When the improvements were all made, Zerby called the townsfolk together, dedicated the playground and turned it over to the miners, their families and friends for the use of their children.

Three dozen or more whitewashed shanties that men had called homes were his next objects of attack, and they were torn down one by one until only the foundations were left. The Kingston Coal Co. then erected neat and cozy little homes, with some modern improvements and back and front porches. The rent for these was made the same as had been paid for the shanties which preceded them.



Employees' Bath-House



Operating Room, Miners' Hospital

No. 4 Colliery of the Kingston Coal Co., at Edwardsville, Penn.

But this was not all. Playgrounds were constructed in other sections by the company, and wherever there were waste spots of ground, flower beds and lawns were planted.

Sidewalks and Garbage Disposal

Civic pride had been awakened and everyone joined in the movement. Mr. Zerby donated about 5 ft. of the property of the company to the borough for sidewalks, and enclosed the company possessions with neatly built and well painted fences so that the grim appearance which had clung to the coal breaker and its surroundings began to disappear. The company provided Edwardsville with a free system of garbage disposal. Several teams and wagons were purchased, drivers supplied, and headquarters opened. The Kingston Coal Co. removes refuse or garbage from any residence in the borough on a request from the property owner.

This system of garbage disposal was another means of nurturing civic pride and the people soon realized that health conditions were the best when refuse was not allowed to accumulate.

Bath Houses and Lunch Rooms

The Kingston Coal Co. spent thousands of dollars in the establishment of inside and outside hospitals, and in building washhouse and lunch rooms for the men. All new buildings erected on the company's property are of concrete and steel construction and are absolutely fireproof. At the No. 4 colliery there is one washroom with 36 bath tubs, a dozen wash bowls and shower baths of the latest design, and this improvement has been much appreciated. Such employees as do not have homes with bathrooms find the company bathhouse a means of saving themselves and their wives and families much labor. Steel lockers have been provided. A man is engaged to keep the bathhouse in order.

Library

Edwardsville had no public library, but the Kingston Coal Co. has set apart one of the best of the company's buildings and arranged reading rooms and study halls in it. Several thousand books have been purchased and the leading magazines and industrial journals are found on the tables. The use of the library is free. The same building is used as a night school, where young and old men attend special classes. Teachers are provided by the company.

Entertainment

The company has organized a band among its employees and supplied them with instruments. A capable instructor has been provided and the band goes from one playground to another to entertain the village folk and the children. A glee club has also been formed which enlivens the playgrounds with vocal music. An expensive Victrola or a Wurtlizer is placed in each playground and while the children enjoy themselves, the older folk are entertained by music to their liking.

Public improvement is still going on at the company's expense. New playgrounds are being mapped out and garden spots are yet to be provided for some of the surrounding towns.

Mr. Zerby has provided one of the best hospitals in the northeastern part of Pennsylvania for his men. Its equipment is so complete that it is more advantageous to perform operations there than to delay operating till a public hospital can be reached. And in fact that was the purpose in building it. The desire was to prevent the injured men from being taken a long distance to a hospital in an ambulance. The company has its own surgeons and does its own surgical work.

As another means of giving back to the men some of the money they have earned, Mr. Zerby, this spring, purchased fruit trees and presented them to the men and women of the town. The company has planted shade trees all over the town, both near its own property and that of others, and the borough in a few years will be a bower of beauty in the summertime.

The coal dust which swept over the town in years past is no more to be seen. Improved devices have made the breaker dustless and the large, black buildings that were reared for the preparation of coal no longer detract from the town's beauty.

In the short space of eight years men and women have been lifted from a low level to the plane of equality. The men know Zerby and Zerby knows the men. They are on close, intimate terms. They understand each other. It has not been necessary for Zerby to state that a good part of the surplus money earned by the men has come back to them. The men and their families understand and they appreciate.

Showing Site on Which No. 1 Playgroun Was Built at Edwardsville

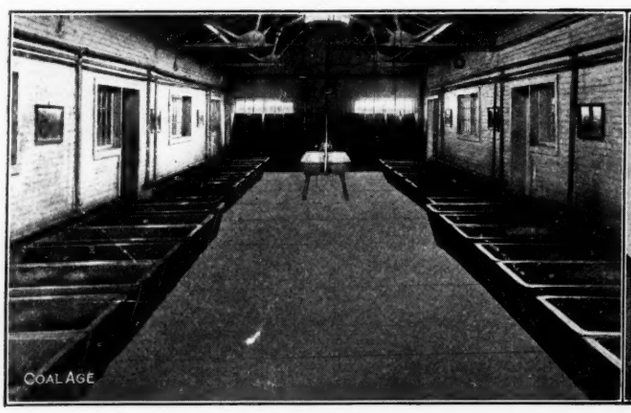
And does it pay? While almost every other coal company has been troubled with petty strikes and trouble, the Kingston Coal Co. has been free of such trouble. One short strike, which was speedily adjusted, is all that has occurred in the eight years. When the mine workers have a grievance they go to Mr. Zerby as a friend and not as a boss. They talk over their troubles with him and they know that he stands with them if their claims are just.

What Mr. Zerby has done here can be done elsewhere, for this experiment proves that there is a common ground for labor and capital. He is entitled to much credit, and the men who labor with him are fully entitled to their share of praise. They are faithful, steadfast and loyal. Every man in the Zerby organization is a master of the position he holds. Valuable service is rendered by each and all, but in the entire corps there is no harder worker, more loyal man than E. L. Solomon, private secretary to Mr. Zerby.

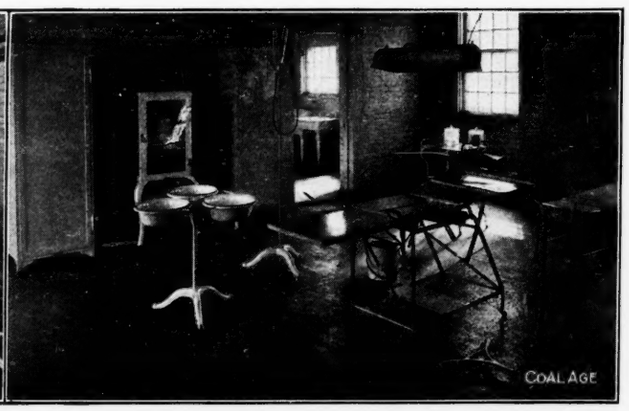
Use the utmost care when handling explosives near electricity as a tiny spark falling on, or a small current passing through powder is all that is necessary to produce an explosion.

had in view. For a time it was slow, tedious work. When he set about his task the miners of his company regarded him as just another of the company officials who had come to rule over them—another official who had come to guard the coffers of the company and see that not a dollar of the company's money was spent imprudently.

Frederick E. Zerby is perhaps one of the most socialistic captains of the mines in the anthracite field. He justly and wisely thinks that a part of the dividends earned by the toilers should be returned to them in the bettering of their conditions and to make their lives happier. At the outset Mr. Zerby had a fight on his hands. The men did not understand him and the prying loose of money from the treasury of the company did not please the financiers. But he won out in both cases. He convinced the men to whom he was responsible that they were entitled to a fair and generous dividend on the money they had invested, and he likewise was able to make them see that by bringing employer and employee into closer relationship both sides would fare better.



EMPLOYEES' BATH-HOUSE



OPERATING ROOM, MINERS' HOSPITAL

No. 4 Colliery of the Kingston Coal Co., at Edwardsville, Penn.

Not many months elapsed before the name Zerby began to be a household word, and his bigness of heart, his concern of others, began to make itself felt. The men who had regarded high officials of the company as bosses were forced to see that in Mr. Zerby they had another type of man.

CLEANING UP THE COMPANY TOWN

His first attention was directed to company property. He ordered a general cleanup, and in a short time the land in close proximity to the coal breakers began to take on a respectable appearance. Here and there little patches of lawn were sown and shade trees were set out and it was startling to the people of the town what wonderful things nature can do with a little help and a little encouragement. Then came the awakening of a civic pride, and men and women joined hands with the Kingston Coal Co. in a thorough cleanup. This good work has gone on incessantly ever since that time.

Improved conditions about the collieries made the men understand that they were appreciated after all. Mr. Zerby mingled with them, got some of their ideas and systematically began to make the people in general understand that he was not their boss but their friend. And a neglected people are quick to catch any such idea. Their comprehension of his motives began the bridging of the chasm of social inequality.

PLAYGROUNDS

Finally Mr. Zerby got help from his backers in the company and sent a force of men to a company plot in the center of Edwardsville to transform it into a park. For days and weeks a force of men were kept at this place. Old fences and shanties which had marred the view were razed and the ground was nicely leveled. Concrete walks and walls began to make their appearance. Gradually hand-ball courts, swings, band-stands, fountains, settees and other equipment were erected. When the improvements were all made, Zerby called the townsfolk together, dedicated the playground and turned it over to the miners, their families and friends for the use of their children.

Three dozen or more whitewashed shanties that men had called homes were his next objects of attack, and they were torn down one by one until only the foundations were left. The Kingston Coal Co. then erected neat and cozy little homes, with some modern improvements and back and front porches. The rent for these was made the same as had been paid for the shanties which preceded them.

But this was not all. Playgrounds were constructed in other sections by the company, and wherever there were waste spots of ground, flower beds and lawns were planted.

SIDEWALKS AND GARBAGE DISPOSAL

Civic pride had been awakened and everyone joined in the movement. Mr. Zerby donated about 5 ft. of the property of the company to the borough for sidewalks, and enclosed the company possessions with neatly built and well painted fences so that the grim appearance which had clung to the coal breaker and its surroundings began to disappear. The company provided Edwardsville with a free system of garbage disposal. Several teams and wagons were purchased, drivers supplied, and headquarters opened. The Kingston Coal Co. removes refuse or garbage from any residence in the borough on a request from the property owner.

This system of garbage disposal was another means of nurturing civic pride and the people soon realized that health conditions were the best when refuse was not allowed to accumulate.

Bath Houses and Lunch Rooms

The Kingston Coal Co. spent thousands of dollars in the establishment of inside and outside hospitals, and in building washhouse and lunch rooms for the men. All new buildings erected on the company's property are of concrete and steel construction and are absolutely fireproof. At the No. 4 colliery there is one washroom with 36 bath tubs, a dozen wash bowls and shower baths of the latest design, and this improvement has been much appreciated. Such employees as do not have homes with bathrooms find the company bathhouse a means of saving themselves and their wives and families much labor. Steel lockers have been provided. A man is engaged to keep the bathhouse in order.

Library

Edwardsville had no public library, but the Kingston Coal Co. has set apart one of the best of the company's buildings and arranged reading rooms and study halls in it. Several thousand books have been purchased and the leading magazines and industrial journals are found on the tables. The use of the library is free. The same building is used as a night school, where young and old men attend special classes. Teachers are provided by the company.

Entertainment

The company has organized a band among its employees and supplied them with instruments. A capable instructor has been provided and the band goes from one playground to another to entertain the village folk and the children. A glee club has also been formed which enlivens the playgrounds with vocal music. An expensive Victrola or a Wurtlizer is placed in each playground and while the children enjoy themselves, the older folk are entertained by music to their liking.

Public improvement is still going on at the company's expense. New playgrounds are being mapped out and garden spots are yet to be provided for some of the surrounding towns.

Mr. Zerby has provided one of the best hospitals in the northeastern part of Pennsylvania for his men. Its equipment is so complete that it is more advantageous to perform operations there than to delay operating till a public hospital can be reached. And in fact that was the purpose in building it. The desire was to prevent the injured men from being taken a long distance to a hospital in an ambulance. The company has its own surgeons and does its own surgical work.

As another means of giving back to the men some of the money they have earned, Mr. Zerby, this spring, purchased fruit trees and presented them to the men and women of the town. The company has planted shade trees all over the town, both near its own property and that of others, and the borough in a few years will be a bower of beauty in the summertime.

The coal dust which swept over the town in years past is no more to be seen. Improved devices have made the breaker dustless and the large, black buildings that were reared for the preparation of coal no longer detract from the town's beauty.

In the short space of eight years men and women have been lifted from a low level to the plane of equality. The men know Zerby and Zerby knows the men. They are on close, intimate terms. They understand each other. It has not been necessary for Zerby to state that a good part of the surplus money earned by the men has come back to them. The men and their families understand and they appreciate.

Showing Site on Which No. 1 Playgroun Was Built at Edwardsville

And does it pay? While almost every other coal company has been troubled with petty strikes and trouble, the Kingston Coal Co. has been free of such trouble. One short strike, which was speedily adjusted, is all that has occurred in the eight years. When the mine workers have a grievance they go to Mr. Zerby as a friend and not as a boss. They talk over their troubles with him and they know that he stands with them if their claims are just.

What Mr. Zerby has done here can be done elsewhere, for this experiment proves that there is a common ground for labor and capital. He is entitled to much credit, and the men who labor with him are fully entitled to their share of praise. They are faithful, steadfast and loyal. Every man in the Zerby organization is a master of the position he holds. Valuable service is rendered by each and all, but in the entire corps there is no harder worker, more loyal man than E. L. Solomon, private secretary to Mr. Zerby.

Use the utmost care when handling explosives near electricity as a tiny spark falling on, or a small current passing through powder is all that is necessary to produce an explosion.

Legal Department

Recent Decisions

By A. L. H. STREET*

False Mercantile Report as Libel—It is actionable libel for a mercantile agency to issue a false report that a corporation has been sued for an amount in excess of its working capital. (Idaho Supreme Court, Pacific Packing Co. vs. Bradstreet Co., 139 Pacific Reporter 1007.)

Pollution of Streams—An owner of land along a stream is not entitled to an award of damages because of slight inconvenience resulting from discoloration of the water or deposit of coal or débris therein in the operation of a coal washer upstream. (Atlantic Supreme Court, Parsons vs. Tennessee Coal, Iron & R.R. Co., 64 Southern Reporter 591.)

Payment for Coal Furnished Public Contractor—Coal and wood used by a public contractor in generating power in ditching work constitutes "material furnished" in the execution of his contract, within the meaning of a bond given by him to secure payment for such material. (Minnesota Supreme Court, Fay vs. Bankers' Surety Co., 146 Northwestern Reporter 359.)

Employer's Duty to Mine Timbermen—A mine owner's duty to timber up mine roofs to make them safe for his employees does not extend to men engaged to do that particular work, since the very nature of their work involves an unsafe condition. (Kentucky Court of Appeals, Williamson's Administrator vs. Blue Grass Fluorspar Co., 160 Southwestern Reporter 920.)

Excessive Recovery for Personal Injury—A verdict for $12,000, for injury to a coal miner is excessive, and should be reduced to $7000, although the action of his right-knee joint was permanently impaired and one of his ribs was loosened in such way as to cause acute congestion of the left lung. (Missouri Supreme Court, Domineck vs. Western Coal & Mining Co., 164 Southwestern Reporter 567.)

Risk Not Assumed by Miner—A mine motorman did not assume the risk of being injured by collision with timbers projecting from another motor, which stood unprotected in an unlighted entry, if he did not know of the presence of such motor at that point and it was not customary to leave cars standing there. (Virginia Supreme Court of Appeals, Stonega Coke & Coal Co. vs. Williams, 80 Southeastern Reporter 100.)

Employee's Duty to Take Notice of Obvious Defects—A mine employee cannot recover for injury resulting from an obvious defect in such simple appliances as harness worn by a mule which he drives, since in such case he has as good, if not better, opportunity than his employer to know of any danger resulting from such condition. (Kentucky Court of Appeals, Pickergill vs. Nelson Creek Coal Co., 160 Southwestern Reporter 936.)

Effect of Bankruptcy on Attachment Liens—On a coal and coke company being adjudged a bankrupt all attachments against its property levied during the previous four months are defeated, except as against a bona fide purchaser of the property under an attachment, and except that an attachment lien may be preserved for the benefit of the estate. (United States District Court, Western District of Kentucky; In re Alabama Coal & Coke Co.; 210 Federal Reporter 940.)

Assumption of Fellow Servant's Negligence—Under the laws of Colorado a coal miner killed by being crushed in a haulway between cars and a wall did not assume the risk of negligence of fellow employees, if he used due care for his own safety. Three thousand five hundred dollars was not excessive recovery for the death, it appearing that decedent was industrious and a man of good habits. (Colorado Court of Appeals, National Fuel Co. vs. Maccia, 139 Pacific Reporter 22.)

When Coke Plant Constitutes an Abatable Nuisance—Persons who reside in the neighborhood of a coke manufacturing plant are entitled to maintain a suit to enjoin its operation in such manner that smoke is almost incessantly emitted from the ovens, dust is created handling soft coal and coke, and sleep is disturbed at night by continual noises. But a mere temporary inconvenience is not subject to redress. (New Jersey Court of Chancery, Kroecker vs. Camden Coke Co., 88 Atlantic Reporter 955.)

Scope of Employer's Indemnity Policy—A policy indemnifying a coal company against claims arising out of injuries to its employees, extended to a man whose name was on the books of the company and who was subject to the orders of the company's general foreman, though he worked under the immediate direction of a sub-boss and his wages were paid according to the amount of coal mined by the sub-boss and the men under him. (Kentucky Court of Appeals, Employers' Indemnity Company vs. Kelly Coal Company, 160 Southwestern Reporter 914.)

Damages Recoverable by Parent for Child's Death—Under the Iowa laws a parent suing a coal company for death of a minor son killed through negligence attributable to the company, is entitled to recover for loss of the child's services and expenses incurred on account of the accident, including expenses for a suitable burial. The amount recoverable for loss of services is measurable by the present worth of the child's probable earnings up to the time he would have become of age, less the probable cost of clothing, maintenance, etc. (Iowa Supreme Court, Carnego vs. Crescent Coal Co., 146 Northwestern Reporter 38.)

Responsibility of Initial Carrier of Shipments—According to a recent decision of the Kansas Supreme Court, the provision of the Carmack Amendment to the Hepburn Act which makes a railway company that receives a shipment for transportation to a point on another road in another state liable for loss occurring on the connecting lines, does not create liability on the part of the initial carrier for loss arising after the shipment has arrived at its destination and is constructively in the hands of the delivering carrier as warehouseman, as where the consignee fails to remove the shipment within a reasonable time after being given notice of its arrival.

Injury Caused by Fleet of Coal Barges—In a suit against a coal company for injury to a Mississippi river wharf and wharf boat at Memphis, caused by a fleet of heavily loaded coal barges in a collision resulting from inability of the towing boats to hold the barges, the jury was warranted in finding that the company was guilty of actionable negligence, although the current of the river was running fast and a heavy fog covered the river; it appearing that the fleet could have been tied up or separated at a point a mile or two up the river. (United States Circuit Court of Appeals, Sixth Circuit; Monongahela River Consol. Coal & Coke Co. vs. River & Rail Storage Co.; 210 Federal Reporter 611.)

When Favoritism By Carrier Constitutes Unlawful Discrimination—It constitutes unlawful discrimination for a railway company to allow one interstate shipper several months' credit for freight charges, pursuant to a previous contract, if other shippers in similar circumstances are required to make payment monthly and to give bond securing the same. The fact of discrimination is not affected because the favored shipper pays interest on the amounts due from him, nor because the shippers discriminated against have not demanded that the same privilege be extended to them, if they did not know that the discrimination existed. (United States Circuit Court of Appeals, Sixth Circuit; Hocking Valley Ry. Co. vs. United States; 210 Federal Reporter 735.)

Right to Rescind Coal-Sales Contract—Damages Recoverable for Breach—When a buyer of coal fails to pay for deliveries at the times provided for by the contract of sale, the seller is entitled to rescind the contract and to refuse to make further deliveries. But, if the seller waives this right of recision, and makes further shipments, notwithstanding the buyer fails to make payments promptly, notice that the contract will thereafter be strictly enforced must be given by the seller before he will be permitted to take advantage of the buyer's failure to make subsequent payments promptly. The damages recoverable for breach of a contract to deliver coal f.o.b. mines are measurable by the excess of the market value of the coal at the mines above the contract price. (Maryland Court of Appeals, Sullivan vs. Boswell, 89 Atlantic Reporter 940.)

---

*Attorney-at-law, 317 Commercial Bldg., St. Paul, Minn.

Discussion By Readers

The Safety Boss in Coal Mining

Some time ago, C. H. Nesbitt, chief mine inspector of Alabama, suggested the employment of a safety boss in coal mines, in a paper entitled The Value of a Safety Inspector and Instructor for Each Coal Mine, COAL AGE, Vol. 4, p. 206. This was followed by an interesting discussion, pp. 318, 509, 743, 827, 912 and 987, under the general title Education and Training of Mining Men.

Many valuable points were brought out in this discussion; but, in only one of the letters submitted—that of Thomas Hogarth, p. 912, was reference made to the employment in mines, of a large number of men wholly unacquainted with mining. To quote Mr. Hogarth, "Shiploads of men who have never seen the inside of a mine are being landed in New York every week, and these men come in large numbers to the mining districts and are put to work in the mines."

There is a vast difference in the workmen of today and those of 25 years ago. While it must be admitted that from 80 to 90 per cent. of the men working in our mines today are foreigners; and, further, that at least 40 per cent. of that number cannot speak or understand the English language, I believe that it is not the green foreigner who heads the list of those injured in the mines. On the contrary, the majority of those injured by avoidable mine accidents belong to that class of foreign labor who have worked in the mines from one to five years and have come to think that they know more than the mine foreman or any of his assistants. Such men become independent and saucy when instructed how to arrange for their own safety. Their customary reply is: "Me know," "Me dig coal one year," "two years," "three years"; "Me take care of meself," "He no come down," "Me shoot him down," and many other similar expressions; but the fact remains that they are not capable of caring for themselves.

I am not opposed to the foreigner, but am strongly opposed to the employment of ignorant workmen in mines, whether they be foreigners or Americans. Such men should never be allowed to work as miners, since, through their ignorance of the principles of mining, they may bring disaster to themselves and their fellow workers. I want to say, emphatically, teach all miners the principles of mining; teach them how to set props, how to sprag coal, how to mine and shoot coal, before permitting them to work as miners. Only experienced miners who have worked a long time in rooms and entries should be permitted to work on pillars.

I fully indorse the suggestion of Mr. Nesbitt, to which I have referred, that there should be employed at every mine, a man whose duty should be to spend all his time in the working places, observing closely the practices of the miners, and instructing them how to cut and mine their coal, set sprags and timbers, place their shots, charge and fire their holes, take down loose top; and, above all, to keep their working places clean, tidy and safe.

This man should be known as the "Safety boss." He should have authority in all matters relating to the safe performance of work in the rooms and other working places of the mine. His sole duty should be the protection of the mine workers against both official neglect or the carelessness or ignorance of the workmen themselves. The safety boss should have the power to suspend any workman who, in his judgment, is not making an effort to comply with the law. The safety boss should act in harmony with but not be subject to the mine foreman. Just how many places could be handled by one safety boss would have to be determined by experiment.

The mine foreman, assistant foremen, safety bosses and miners should all be thoroughly posted on the requirements of the state mining law and the mine regulations.

A good idea would be to have the mine rules printed in the various languages, on cards, which should be given to each miner when he is employed. The cards should also be hung in conspicuous places near the mine. I would further suggest the following rules.

1. When undermining coal, set sprags every 7 ft., whether or not there is danger of the coal falling.
2. When you have fired a blast wait at least 5 min. before going to see what the shot has done.
3. Do not charge any hole but especially a rock hole with both dynamite and powder.
4. Always set a temporary prop whenever you are about to knock out another prop.
5. Don't imagine because you have never been hurt that it is impossible for you to get hurt.
6. Never stand a prop further away from the working face than is permitted by the mine rules.
7. Always reset any timber that has been dislodged by a blast, before you begin to mine or load coal.
8. Whenever you chance to notice a piece of loose coal, slate or rock while on the way out of the mine, promptly notify the mine foreman.

It would be the duty of the mine foreman to see that these rules and suggestions were strictly enforced; and this, in my opinion, would greatly reduce accidents due to falls of coal, slate or rock.

JOSEPH NORTHOVER, Assistant Foreman,
Berwind-White Coal Mining Co.
Seanor, Penn.

Safety or Refuge Chambers in Mines

Letter No. 5—I have read with great interest the recent contributions to COAL AGE, relating to Safety or Refuge Chambers in Mines. The discussion calls to mind a letter on this subject, written by Jesse K. Johnston, May 10, 1910. The letter was addressed to Hon. John K. Tener, then a member of the House of Representatives and now Governor of Pennsylvania. Mr. Johnston was at the time superintendent of the Charleroi Coal Works of the Pittsburgh Plate Glass Co.

The letter, from which I submit a few extracts, was made a part of the Congressional Record of the 61st Congress; and, besides giving a large number of instances of mine explosions, in many of which, lives would have been saved had refuge chambers been available, described, in detail, a plan that was then about to be executed in the Charleroi mine, when suddenly interrupted by the destruction of the tipple by fire and the subsequent abandonment of the mine. I wish that space would permit of the publication of the entire letter, but beg to quote the following allusions to the need of refuge chambers in mines, as of particular interest in this discussion:

* * * How to get results from miners, who have no faith in science and, by ignorance, disregard precautions and safeguards and become chance takers for greed of gain, is a difficult problem for every mine manager.

I know from personal experience that the introduction of permissible explosives, systems of spraying, taking exhaust steam into the intake airways to increase the moisture in the air during the winter months and other precautions, meet with much opposition on the part of mine workers.

In every coal mine, conditions exist that may lead to an explosion or a mine fire. While we cannot hope for the entire removal of these dangers, yet by the practical application of the results of scientific study, coupled with the eternal vigilance of mine officials, the maintenance of strict discipline and the enforcement of rules and regulations, the dangers may be minimized. * * *

It is a significant fact that from Apr. 13, 1876, to Apr. 22, 1910, in this country alone, 49 mine disasters occurred during the summer months, resulting in the loss of 1300 lives. For the same period, during the winter months, there occurred in this country alone, 111 mine disasters, resulting in a loss of 3500 lives, making a total sacrifice of 4800 lives in 34 years. These figures only include mine disasters in this country, in which five or more persons were killed.

In addition to the present safeguards, I wish to offer another, having for its purpose the preservation of life, following a mine disaster. I base my suggestion on the evidence gained from miners rescued and from investigations giving conclusive evidence that miners have traveled from 1000 to 2000 ft. in the mine, after the first shock of the explosion and before being overcome by poisonous gases. * * *

My suggestion of live-saving stations underground, connected with the surface by boreholes is not new; the idea has been advocated for years. * * *

I know a great many mine managers will say at first thought, that the cost of these underground stations is prohibitive; but I have just let a contract for three 6-in. boreholes, at the rate of $1 per ft., for a depth of 300 ft. Consider, for a moment, a mine property of 1000 acres in coal that will yield 8000 tons to the acre; and compare the revenue to be derived from the mining of this coal, with the cost of sinking, say three boreholes and the instalment of the same number of underground life-saving stations. This cost will be found such a small fractional part, per ton of coal mined, as to fully justify the installation; and the outlay can generally be saved by cutting off some other expense that is less needed. * * *

An actual test made on a 6-in. borehole, 300 ft. in depth, showed a velocity of the air passing up the hole, of 2000 ft. per min. (nearly 400 cu.ft. per min.). In the recent Cherry mine disaster (Nov. 13, 1909), 21 men were rescued one week after the mine fire started; from an atmosphere in which there seems to have been upward of 5 per cent. of carbon dioxide and in which lamps would not burn. It is reasonable to conclude that if several underground life-saving stations, with boreholes to the working seams, had been previously installed at the Cherry mine, a number of the entombed miners could have reached these stations and a supply of fresh air and plenty of food could have been delivered from the surface. * * *

The letter continues to give a large number of similar instances of the possibility of saving human life by the previous installation of suitable refuge chambers, and, to my mind, is an emphatic indorsement in their favor.

V. L. HENRY, Mining Engineer,
Creighton Coal Works.

Creighton, Penn.

Educating the Public

Under this same heading, Mine Inspector, in COAL AGE, May 2, p. 714, says, "A striking example of the inefficiency of state ownership of mines, mentioned by Prof. Henry Louis, in an address before the Newcastle-upon-Tyne Economic Society, is that of the Wonthaggi mine owned by the Victoria government," and previous to this Mine Inspector says, "In any enterprise, whether individual or corporate, labor and capital combine through their energy, skill and financial resources to supply a product for the public in a satisfactory manner."

The *Saturday Evening Post,* under date of May 16, and under title of "The Vortex," says, "You cannot get joy out of work unless it is a sort of personal service. Unless you own your job in some sort of permanent way, you will not sing over it. My grandfather was a shoemaker and he always sang as he cobbled. My father went into a factory and he never sang. He got crusty and short over his work."

Without another comment, I believe the two quotations, coupled as they are above, would accomplish my purpose, which is to start readers thinking along constructive lines. However, as nothing stimulates thought so much as the opportunity to criticize another's thoughts, ideas or suggestions, I will offer a few ideas, hoping for such criticism.

Mine Inspector has quoted the inefficiency of state ownership of mines where it has been tried. In referring to this question, I do not wish to convey the idea that I commend either state ownership or the present form of government in the United States. Both leave room for considerable improvement; but, is it not possible through the failure of both of these plans to devise an efficient ownership wherein the public would share directly and not in the present indirect way in which there is always a doubt that the laborer is really sharing at all? Let us not be reactionary, but let us be constructively progressive.

Has the combination of labor and capital been of the participants' own free will and accord? Has it been efficient? Is it not possible to devise a system whereby the combination could become a work of joy on the part of both capital and labor? Mr. Ford seems to have at least made a start in this direction. If the news report is to be credited, the increased efficiency since the inauguration of the profit-sharing plan, in the Ford Motor Car works, is 40 per cent. Could not Mr. Ford's system be revised and applied to coal mining? I believe it possible.

We who have been in the business of mining bituminous coal, in the United States, east of the Mississippi River, know the enormous profits in coal mining, with properly equipped mines, when taken as a whole; that is to say, the profits of mining plus the profits of stores and rents. We also know the heart-breaking worries of the manager who tries to squeeze out profits from poorly equipped mines, which are so frequently over-capitalized by the over-zealous promoter.

Though some of the larger coal-mining corporations are clearly producing splendid profits, I firmly believe that the personal efficiency of the employees of the best of these companies can be increased at least 10 per cent. by some profit-sharing plan.

MINING ENGINEER.

———, Ky.

The Eccles Explosion

The map of Eccles No. 5, the mine which recently was the scene of a disastrous explosion, COAL AGE, May 23, p. 848, leads me to offer a few remarks on the dangerous conditions existing at that mine. A mine of this size should be worked on the long-wall-plane system, with triple entries. In fact, no other system should be considered and the exclusive use of safety lamps should be required. More splits and overcasts will, of course, be needed, but if such precautions were adopted, explosions would involve a smaller area and destroy fewer lives.

As can be seen on the map referred to above, the air entering the first right of the southern section of the mine travels, from the first to the last, through 8 entries, running up one heading and down the other, until it reaches No. 6 shaft. Now, suppose that 8 men, one in each of these headings fired a shot apiece; the quantity of coal thus shot down might release enough gas to raise the percentage of gas in those places, to the danger point. This firedamp might be ignited by a solid shot fired in the last place through which the air traveled.

The "flies" used in the mines are dangerous to men and mules and are not desirable. It is better to provide an excess of ventilation that would produce a sufficient circulation of air in the rooms, rather than depend on the use of curtains. This explosion was quite general and seems to suggest, though it does not prove the fact that the mine, which was kept well watered, had a dangerous percentage of gas present not in one portion only but throughout the workings.

I have traveled over a large part of West Virginia in the last 8 months and am afraid there is evidence that the compensation act, by distributing the blame, is decreasing the sense of personal liability. The burden of accidents, which formerly rested on those who owned the mines where they occurred, is now spread among all operators of mines; and the sense that the burden is not on the corporation but on the whole industry in the state makes some managers and foremen careless.

I visited a place in West Virginia recently and was told by one of the daymen that last August he had ordered posts to set under some bad roof. These were not supplied, and in January of this year when the men went to work, the slate had fallen and the mine was stopped for a day to clean up. The mine foreman at this place knew something about electricity and he retained his position because of this knowledge and not because his practice in coal mining was sufficient to justify his retention.

SAMPSON SMITH.

Mineral, W. Va.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Proportion—A proportion, in arithmetic, is the expression of equality between two or more ratios of different kinds. A proportion may be either simple or compound.

Simple Proportion—A simple proportion is one in which both couplets are simple ratios. For example, in reference to mine airways, one airway may have twice the sectional area of another airway; the area of the first being, say 24 sq.ft. and that of the second 48 sq.ft. The ratio of these areas or the **area ratio** is 24: 48 or 1: 2.

It is evident that, for the same velocity of the air current, the quantity of air passing in the first airway will be one-half that in the second airway; the first circulation being, say 10,000 cu.ft. per min., the second will be twice that quantity of air, or 20,000 cu.ft. per min. The ratio of these quantities or the **quantity ratio** is then 10,000: 20,000, or 1: 2, as before.

The ratios just shown, though of different kind, are equal and may be written as two ratios with the sign of equality between them; thus,

$$\frac{48}{24} = \frac{20{,}000}{10{,}000};$$

or as a proportion; thus,

$$24 : 48 :: 10{,}000 : 20{,}000.$$

Instead of the sign of equality (=) used above, it is more common to write a proportion with a double colon (::) separating the two couplets or ratios; thus,

$$24 : 48 :: 10{,}000 : 20{,}000$$

The above is a simple proportion, because it expresses the equality of two simple ratios.

Compound Proportion—A compound proportion is one in which one or both couplets are compound ratios. To illustrate this case, suppose that both the sectional area and the velocity of the air current are different in two airways. It is evident that the quantity of air passing in each airway will vary in the same ratio as the area and velocity, respectively.

For example, assume, as previously, that 10,000 cu.ft. of air is passing in the first airway, which has an area of 24 sq.ft. The same velocity of the air current will produce 20,000 cu.ft. per min. in the second airway, which has an area of 48 sq.ft. But if the velocity in the second airway is increased, it is evident that the quantity of air will be increased in the same ratio. If the velocity in the second airway is, say three times that in the first, the quantity of air passing will be $3 \times 20{,}000 = 60{,}000$ cu.ft. per min.

In this case the area ratio is 1: 2; the velocity ratio, 1: 3; and the quantity ratio is the product of these two ratios or 1: 6. This is expressed as a compound ratio thus,

$$10{,}000 : 60{,}000 :: \begin{matrix}1 \\ 1\end{matrix} : \begin{matrix}2 \\ 3\end{matrix}$$

or finally by multiplying together the terms of the compound ratio to obtain a simple ratio, the proportion is

$$10{,}000 : 60{,}000 :: 1 : 6$$

The Coal Age Pocket Book

A compound proportion may have any number of simple ratios in either one or both couplets; but the proportion can always be reduced to a simple form by multiplying together the similar terms in each couplet.

Direct Proportion—Proportion is mostly used to compare similar terms or factors, in respect to two states, conditions, or things. A direct proportion is one in which the order of comparison is the same in each couplet or ratio.

For example, in comparing the circulation in two airways of the same section but different length; other things being equal, the pressure producing the circulation varies directly as the length of the airway. In this case, the proportion is direct; because,

1st pressure : 2nd pressure :: 1st length : 2nd length

The ratios in this proportion are each **direct ratios,** because the order of comparison is the same in each.

Indirect or Inverse Proportion—It frequently happens that, as one factor increases, another decreases in the same ratio. In that case, the resulting proportion is indirect; and the second couplet is an **inverse ratio,** because the order of comparison is reversed.

For example, for a constant velocity of the air current, in two airways having equal rubbing surface, the pressure per square foot varies inversely as the sectional area of the airway, which is expressed by an indirect proportion, as follows:

1st pressure : 2nd pressure :: 2nd area : 1st area

The second couplet in this proportion is an **inverse ratio,** because the order of comparison is reversed.

Terms—The first term of a ratio is called the "antecedent" and the second the "consequent."

In every proportion, there are four terms. The first and fourth terms are called the "extremes" and the second and third the "means." The product of the extremes is always equal to the product of the means.

Simple proportion is often called the "Rule of Three," because it contains three known terms, as **a, b, c;** and one unknown term, which is designated by **x.**

The relation of these four terms and the various operations possible in proportion, are best shown by the following simple formulas:

$$a : b :: c : x$$
$$ax = bc$$
$$x = \frac{bc}{a}$$
$$a + b : b :: c + x : x$$
$$a - b : b :: c - x : x$$

In any proportion the means can be reversed; thus,

$$a : c :: b : x$$

In the solution of problems involving a proportion, either simple or compound, much time and labor is saved by writing the several ratios as fractions and canceling factors common to both numerator and denominator, which simplifies the work.

Inquiries of General Interest

A Problem in Mechanics

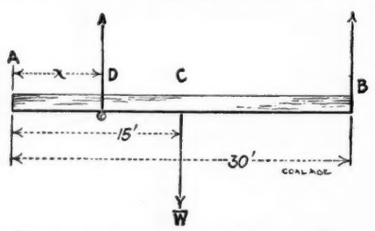
Kindly answer the following question to settle a little controversy. The question is as follows:

A stick, 30 ft. in length and of uniform weight and cross-section throughout, is carried by three men. How far from one end of the stick must a cross-pole be placed so that each of the two men holding this pole will carry the same weight as the third man lifting the other end?

X.

Hopedale, Ohio.

This is a simple problem in mechanics and is readily solved by the principle of moments. The stick AB, in the accompanying figure, being uniform in cross-section, its center of gravity is at the middle point C or 15 ft. from either end; and the weight W of the stick acts downward through this center of gravity as indicated by the arrow.



TIMBER CARRIED BY THREE MEN

In the solution, the center of moments may be taken at any point along its length; but, for simplicity, assume the center of moments is at the end B of the stick, which is carried by the one man. Then, since the weight of the stick is W and two-thirds of this weight is carred by two men on the crosspole at D, calling the distance of this pole from the end $AD = x$, we have, by the principle of moments,

$$\tfrac{2}{3} W (30 - x) = 15 W$$
$$20 - \tfrac{2}{3} x = 15$$
$$\tfrac{2}{3} x = 20 - 15 = 5$$
$$x = \tfrac{3}{2} \times 5 = 7\tfrac{1}{2} \text{ ft.}$$

Therefore, the cross-pole between the two men should be 7.5 ft. from one end, so that each of these men will bear an equal weight with the third man at the other end of the stick.

A Longwall Proposition

I am much interested in the future of longwall methods for mining coal, and have read with pleasure and profit the discussion on this subject, in recent issues of COAL AGE. At the present time, I have a proposition that I would like to bring before the readers of the paper, in order to get their opinion as to whether the conditions given are favorable to longwall work.

Briefly stated, the conditions are as follows: The mine is a drift mine, with an average thickness of overburden of say, 300 ft. The coal is of a fair average quality; the seam has generally little or no inclination, and a uniform thickness of 36 in., with a fireclay bottom and a slate roof. The fireclay is hard when first exposed, but softens somewhat in contact with air and water. The bottom has a tendency to heave slowly in narrow work; but this heaving is a little more rapid in the rooms. It has, however, given us no trouble in working the rooms, except where a squeeze has started. In such cases, I have known the bottom to heave in the rooms 3 in. in a single day. Ordinarily, the bottom will not heave over 6 in. during the life of a room.

The roof slate is hard, so hard that it must be shot down, although it does not require heavy shooting to do this. Our greatest difficulty lies in the fact that the slate is overlaid with a hard "sulphur binder," which will not break and is the real cause of the frequent occurrences of squeeze or creep. We have lost considerable territory owing to this cause.

Our method of working has been to drive all entries on the double-entry system, turning the rooms off the cross-entries. Each room is driven with a 100-ft. face, there being three roadways to each room. The rooms are driven 150 ft. deep and are all posted on 4-ft. centers, to within 12 ft. of the face. Six inches of bottom is taken up on the roads in the rooms, in order to give sufficient headroom to take the cars to the face. The rooms generally fail by the roof slate caving to a height of from 4 to 10 ft., up to the "sulphur binder," which we have found it impossible to break.

When a squeeze takes place, the roof generally remains firm, but the coal is forced out into the entry and the bottom heaves rapidly, as I have stated. So strong is the overlying "sulphur binder," that I have known the rooms to be worked out for a distance of 600 ft. along the entry and to a depth of 150 ft., all the posts and room pillars having been drawn back. In all this area, the roof did not cave and the bottom heaved but 10 in.

What I particularly desire, is information in regard to the manner and cost of building packwalls, and an expression of opinion as to whether or not the conditions I have described are favorable to longwall work.

H. R. HARTSUFF, Supt.,
Beaver Coal & Coke Co.

Wampum, Penn.

[The manner of building packwalls and cribs, chocks, or cogs, in longwall work, as well as the general method of procedure, has been fully explained in the letters on Longwall Mining Methods, COAL AGE, Jan. 10, p. 99, and Feb. 21, p. 339. As the subject of longwall mining is growing in interest every day, we shall be glad to publish further suggestions relating to the mining of the coal in this particular seam.

The chief difficulty is encountered in the hard "sulphur binder," which correspondent states "will not break." Assuming that this rock will support the overburden without being broken, over a large area, say 50x200 yd., what measures should be adopted for the safe working of this seam, so as to insure the complete extraction of all pillar coal.—ED.]

Examination Questions

Anthracite Mine Foremen's and Assistant Mine Foremen's Examination Held at Pottsville, Penn., May 25, 26, 1914

Ques. 1—What are the qualifications for mine foreman and assistant mine foreman, to fully fit them for the position, and what are their duties?

Ans.—Candidates for the position of mine foreman or assistant mine foreman, in the anthracite district of Pennsylvania, are required by law to pass a satisfactory examination and to give satisfactory evidence of at least five years' practical experience as a miner, good conduct, capability and sobriety, before they can obtain a certificate from the examining board, qualifying them to hold that position in any mine in the state.

In addition to the legal requirements, the successful mine foreman must be intelligent, industrious, observing, a good judge of human nature and of what constitutes a day's work. He must be thoroughly acquainted with mining conditions and methods of working. Aside from their legal duties, both the mine foreman and his assistants must devote their entire time to the inspection of the working places in the mine and the oversight of the men. Their duties include the inspection of all the machinery and equipment employed in the operation of the mine.

Ques. 2—What practical experience have you had in the anthracite coal mines of Pennsylvania? State in what mines employed, the character of the mines and the nature and length of your service in each.

Ans.—This question is answered from the candidate's own experience.

Ques. 3—What duties does the law impose on the mine foreman and his assistants?

Ans.—The duties of the mine foreman, as described by the present anthracite mine law, are given mostly in Art. 12. The mine foreman has charge of all matters pertaining to ventilation; he must examine, at least once a week, all accessible parts of those abandoned portions of a mine in which explosive gases have been found. The mine foreman or assistant mine foreman must examine carefully, every morning, all working places, and traveling roads in the mine, before the men are allowed to enter. This examination must be made with a safety lamp, within three hours of the time for beginning work, and must be recorded in a book kept at the mine for the purpose. The person making the examination must mark plainly the date of same at the face of each working place examined.

Beside the daily morning examination, the mine foreman or his assistant must visit and examine carefully, at least each alternate day, every working place in the mine while the men are or should be at work in such place, and must give all necessary instructions for the safety of the men. The mine foreman or some other competent person designated by him must examine, at least once every day, all slopes, shafts, main roads, traveling ways, signal apparatus, pulleys and timbering, to ascertain that they are safe and in good working condition.

Ques. 4—On what scale does the law require the maps of a mine to be made, and how are the distances represented—horizontally or as measured on the various pitches?

Ans.—The anthracite mine law (Art. 3. Sec. 1) requires that an accurate map may be made of the workings of every coal mine, on a scale of 100 ft. to the inch. In general, mine maps are constructed on a horizontal plane of projection, all distances on the map being horizontal distances. The law requires that the map shall state, in degrees, the general inclination of the strata, together with any material deviation therefrom in portions of the workings. The map must also state the tidal elevation of the bottom of each shaft, slope, tunnel and gangway and other important points in the mine or on the surface, as required by the mine inspector of the district in which the mine is located.

Ques. 5—What are the conditions that should be taken into consideration in determining the width of breasts and pillars? Should these be of equal width, under all circumstances?

Ans.—The principal factors that determine the width of breasts and pillars in mine workings are the following: Depth of cover, as determining the roof pressure; thickness and inclination of the seam; character of the roof, floor and coal; the existence and condition of overlying or underlying seams of coal; and the existence of water or gas in the strata. No uniform or universal width of opening and pillar can be employed under all conditions as these vary widely.

Ques. 6—If the map shows a distance of 200 ft. between the gangway and the landline parallel to the gangway; how far can a breast be driven without crossing the line, where the pitch is 48 deg.?

Ans.—The length of the breast measured on the pitch, from the gangway to the landline is:

$$\frac{200}{cos\ 48^\circ} = \frac{200}{0.669} = 298.9\ ft.$$

Ques. 7—What is natural ventilation; and is such ventilation reliable for mining purposes? State why.

Ans.—The ventilation in a mine is said to be natural when the circulation of the air current throughout the mine is created and maintained by natural means or agencies; such, for example, as the formation of air columns in the shaft, or in the rise or dip workings; the action of a waterfall in a shaft; or surface winds deflected into the mine workings. The means last mentioned are seldom employed and, then, only when the conditions are exceptionally favorable. Natural ventilation is unreliable for mining purposes, owing to the constantly changing conditions that make the circulation of the air in the mine uncertain and not easily regulated to meet requirements in the workings.

Coal and Coke News

Washington, D. C.

It is believed that during the current session of Congress some action will be taken designed to create a more centralized government for Alaska or at all events to centralize the power of controlling that territory insofar as relates to industrial developments, in a smaller number of hands. It has been doubtful for a good while whether Congress could be spurred up to taking the necessary steps, but Secretary Lane with, it is understood, the approval of the President, is now exerting himself to get some attention for the matter and to secure the examination of bills which are pending for vesting the management of Alaskan affairs as he desires, in the Interior Department.

Attention has been attracted to a special report recently filed by Mr. Lane in which he recommends the appointment of "a development board" for Alaska, such board to have complete control of all affairs connected with natural resources and the development of the territory. The board would consist of three members with headquarters in Alaska and its function would be to carry on the work of the general land office, the road commission, the bureau of mines, the bureau of education, and the Secretary of the Interior.

Special stress is laid upon the work that would be done by the board in connection with the management of mines. Mr. Lane offers severe criticism regarding red tape in Alaska. He points out that at present each of at least a score of government bureaus in Washington have something to do with the government of Alaska, resulting in a vast amount of red tape and circumlocution in the administration of public affairs. He cites instances of delays of several years in the handling of uncomplicated land, and other matters which should have been disposed of.

"Our present system of government in Alaska, is heterologous," says the Secretary. "Instead of one government there are a number, interlocked, overlapped, cumbersome and confusing. Experience has demonstrated that efficient administration is best secured by centralizing responsibility and authority in the hands of a few men, who can be held to strict accountability for the results of their actions. The proposed development board for Alaska follows this modern and well tested plan for securing efficient administration."

The Tap-Line Cases

More and more importance is being attached to the decision of the Supreme Court in the tap-line cases handed down a few days ago. The growing opinion among lawyers is that the decision since it affects the relation of trunk lines and industrial roads will necessitate the Interstate Commerce Commission's revising its decision respecting the division of through rates between the trunk lines and the short industrial railroads owned by the United States Steel Corporation and the coal roads as well as by other concerns which are in like position. The effect would be to alter considerably the circumstances of transporting ores and coal.

What is considered the essential part of the opinion in the light of further study, is found in those paragraphs which have to do with the definition given by the commission to the tap lines. In discussing the question, "Are tap lines plant facilities or common carriers," the court says that it was insisted that the roads were not common carriers because most of their traffic was in their own items of production.

The final draft of the opinion as published, however, goes on to note that the conclusion already indicated above, "loses sight of the principle that the extent to which a railroad is used does not determine the fact whether it is or is not a common carrier. It is the right of the public to use the road's facilities and to demand use of it, rather than the extent of its business which is the real criterion determinative of its character. . . . . We think the commission exceeded its authority when it condemned these roads as a mere attempt to evade the law and secure rebates and preferences for themselves.

It is doubtless true as the commission amply shows in its full report and supplementary report in these cases that abuses exist in the conduct and practice of these lines and in their dealings with the carriers, which have resulted in unfair advantages to the owners of some tap lines and to discrimination against the owners of others.

Because we reached the conclusion that the tap lines involved in the appeals are common carriers and as such entitled to participation in joint rates with other common carriers, that determination falls far short of deciding, indeed does not at all decide, that the divisions of such joint rates may be made at the will of the carriers involved and without any authority of the commission to control them. . . . . If the divisions of joint rates are such as to amount to rebates or discriminations in favor of the owners of the tap lines, because of their disproportionate amount, in view of the service rendered, it is within the province of the commission to reduce the amount so that the tap line shall receive just compensation only for what it actually does."

The effect of the decision upon some of the revised rates on iron and steel, iron ore and coal will, it is expected, be direct and immediate, necessitating revision by the commission of the decisions it has handed down in a number of such cases within recent periods.

HARRISBURG, PENN.

Governor Tener, on May 27, made announcement of the Lake Erie and Ohio River Canal Commission, authorized by the last Legislature. The purpose of the board is to take up the preliminary work for the construction, if possible, of a ship canal from Pittsburgh to Lake Erie, through the Beaver and Mahoning Valleys. The members of the board were named as follows:

President, W. A. Magee, Pittsburgh; A. S. McSwigan, Pittsburgh; Col. Thomas W. Symons, Washington, D. C.; T. P. Sloan, Lock No. 4 and James A. Chambers.

The first duty of the board will be to have a survey made, the sum of $150,000 having been appropriated by the state for this work. The board has jurisdiction over the entire work and is given authority to appoint a secretary, a treasurer, a chief engineer and such other assistants as may be necessary. It is to make a report to the governor each year of the progress made. The governor has the right to remove any member. Each member is to furnish bond in the sum of $25,000 for the faithful performance of his duty. The president will receive a salary of $5000 per year and each member $4000 a year. The appointments take effect at once.

The sister states of Ohio and West Virginia last year enacted some unusual legislation conferring the right virtually of eminent domain upon the Canal Commission which the Commonwealth of Pennsylvania would organize. Thus the Pennsylvania board will supervise the whole project which now seems absolutely after long agitation to be beyond stoppage.

The Legislatures of West Virginia and Ohio authorized counties contiguous to the canal to bond themselves at elections for a pro rata amount of the $60,000,000 which it is estimated the big waterway will cost. This amount, however, is to cover the interest on the bonds until such period when the tolls on the traffic shall have provided for the annual installments of interest.

PENNSYLVANIA

Anthracite

Minersville — Anthony Bushing was killed and Anthony Koshokskie probably fatally injured in addition to being blinded by a premature dynamite blast in the Buck Ridge colliery on May 27. The men were hurled a long distance above a gangway.

Hazleton—Andrew Matti, vice-president of the United Mine Workers of the Hazleton district, was arrainged before an alderman on May 28, charged by the State Police, with disorderly conduct and inciting to riot at McAdoo. Matti was held under $500 bail. The case is the direct result of the Hazleton trolley strike. Matti had trouble with two of the strike breakers who had him arrested.

Failure to insulate a wire in the Harleigh mine of the Harleigh-Brookwood Coal Co. has cost that corporation $5325, which must be paid to Mrs. Bridget Gallagher for the death of her son who was killed from an electric shock.

Scranton—A number of outside employees at the West Ridge colliery of the Scranton Coal Co. went on strike recently complaining that they were not being paid the scheduled rate of wages.

The examination of candidates for mine foremen's and assistant mine foremen's certificates in the anthracite region of Pennsylvania which was previously announced to be held Apr. 15 and 16 and later postponed until the latter part of May was held May 23 and 26. An unusually large number of men took the examinations which were held at Scranton, Old Forge, Pottsville and other points.

Brinkerton—Declaring he recognized no law, but the law of God, William T. Fox, a miner, opened fire on four members of the State Constabulary on May 29, and was riddled with bullets by the troopers. Fox has previously shot F. C. Roberts, superintendent of the Fairmount Coal Co.

Lattimer Station—Employees of the Cranberry Colliery, of A. Parddee & Co. on May 27, voted to continue the strike to force six miners into the union. The statement was made that to collect dues of delinquents amounting to approximately $16 the employees have lost by idleness wages aggregating about $21,000.

Maysville—During a storm on May 27, lightning wrecked the top of the Scott shaft and power plant, also the Richards and Hickory Ridge collieries, of the Susquehanna Coal Co., causing operations to be suspended. A number of men had narrow escapes.

Tamaqua—Six miners were killed and two badly injured at the Mary D colliery on May 29 when the cage in which they were riding to the surface turned turtle after it had gone 40 ft. past the landing where the men were supposed to disembark. One man jumped while the cage was several feet in the air landing upon a beam and crushing his skull. The other five dropped 700 ft. into a sump at the bottom of the shaft. One man saved his life by catching a chain, while another caught upon a projection and escaped with a broken leg. It is not known whether this accident was due to negligence or some mechanical defect.

Bituminous

Connellsville—When arraigned before a justice on information made by Inspector Alexander McCanch, Andy Pohts, a miner employed at the Black Diamond mine near Monongahela, entered a plea of guilty to violating the mining laws. He had refused to obey an order to place a post at a dangerous point in one of the rooms and was sentenced to pay the costs and a fine of $25.

It is reported that the Connellsville and lower Connellsville regions with 22,678 ovens in blast out of a total of 37,935 are running at just 50 per cent. of rated capacity. Against this, however, is the assurance of some optimistic steel men that business is certain to improve especially if the railroad rate case is favorably decided.

Washington—Another suit as a result of the explosion in the Cincinnati mine Apr. 23, 1913, was filed here May 25 when Mrs. Mary Hager began action to recover $50,000 damages from the Monongahela River Consolidated Coal & Coke Co. for the death of her husband, Charles Hager. She alleges that the coal company was negligent and failed to comply with a law providing for the safety of miners.

Brier Hill—Mine inspectors I. G. Roby, J. P. Walsh and W. H. Howarth, together with a number of mine superintendents, foremen and pit bosses recently inspected the new automatic safety lock for mine cages invented and patented by W. J. Phelan. This device has been in operation at the Brier Hill works for some time past and has proven highly successful.

Rockwood—The Maher Coal & Coke Co., which was recently organized, has reopened the old Shamrock mine and has employed about 30 miners, but expects in the near future to employ a much larger number and will ship from 150 to 200 tons of coal per day.

WEST VIRGINIA

Charleston—After the action of union representatives calling a strike of the miners in the Kanawha district, effective, Monday, June 1, represntatives of four large operators on Paint Creek met Saturday with the officials of the United Mine Workers, and effected a tentative working arangement, independent of other mines in the district, under which the mines on Paint Creek will be continued in operation for the time being. The Paint Creek Collieries Co., the largest of the four companies, entered into an agreement carrying with it the operation of the check-off, the only point in dispute, as far as the district as a whole is concerned, and leaving to arbitration later on a dispute over the wage contract in the splint and gas seams. The Standard Splint and Gas Coal Co., the Imperial Colliery Co. and the Christian Colliery Co., who were also in the conference, have the same plan under consideration, and will probably adopt it, it is understood, while the National Bituminous Coal & Coke Co., operating at Eskdale, on Cabin Creek, is said to be willing to consider a like arrangement.

Wheeling—The city of Wheeling drilling for water recently struck coal at a depth of 113 ft. This deposit appears to be extensive, and so far as can be learned was never previously known to exist. The well being drilled for water was abandoned as a dry hole.

KENTUCKY

Fleming—The Mineral Fuel Co., operating at Fleming, Haymond and Hemphill, on Potters Fork and Yount's Fork respectively, has changed its name to the Elk Horn Mining Corporation. Thomas S. Haymond continues as manager. New increases and extensions are also planned for the near future.

Lookout—The Rockhouse Coal Co. announces increases in its coal operations here and will increase from 50 to 75 cars per day.

Whitesburg—Five hundred or more miners have been added to the forces employed in the Jenkins and McRoberts fields, according to information received here. Most of the mines in this district are running to full capacity.

OHIO

Murray—A small coal mine has been opened near this place by the North Hocking Coal Co.

Steubenville—The fire in the Robert Hill mine which has burned for years recently spread to the Henry Wilson mine, compelling the suspension of operations in this development.

Martins Ferry—The Aetna-Standard mill mine and the Blockhouse mine have agreed to the 1914 wage scale contract calling for the miners' prices for mine run coal. These were the first contracts to be signed under the new wage scale demanded by the miners. The Aetna mill mine has been working under a provisional agreement for some time.

Coshocton—The Locust Grove Coal Co., of Coshocton, will be the first firm to be sued by the state for an award for injury to an employee because of failing to contribute to the Workmen's Compensation Fund of the state. John Smalley, an employee, met with an accident which laid him up for four weeks. Applying for workmen's compensation his employers were ordered by the State Industrial Commission to pay him $48. This the company refused to do, and the state will sue for this amount, plus a penalty of 50 per cent.

INDIANA

Indianapolis—The program for the annual meeting of the Michigan-Ohio-Indiana Coal Association, which will be held at Indianapolis, June 23 and 24, has been announced by Secretary B. F. Nigh, of Columbus. The program calls for long business sessions the two days of the convention with a varied entertainment program. The officers of the organization are urging all of the members and guests to attend the business sessions as a number of interesting addresses have been provided.

Evansville—C. N. Coupland, London, England, has been making trips from here into western and central Kentucky taking options on thousands of acres of coal lands. He says he represents a syndicate willing to spend $20,000,000 in Kentucky coal properties.

Jasonville—The Lattas Creek mine, employing 300 men, has resumed operations. The Bogle mine, northeast of here, is being dismantled and will be abandoned.

Linton—The Vandalia Coal Co. has started two more of its mines, employing 500 men.

ILLINOIS

Johnston City—The Cambria Coal Co., a shaft for which was sunk northwest of this place several years ago, is about to open up the property. J. L. Mitchell, of Coffeen, has the controlling interest, and it is understood the contracts will be let shortly for the equipment. Connections are anticipated with the Burlington, C. & E. I., Iron Mountain and Illinois Central.

Benton—The Middle Fork Coal Co., a new undertaking, is sinking a mine a few miles southeast of this place. It is understood the mine will have a capacity of 4000 tons a day, and the work of sinking the shatf is now in progress.

Marion—The work of raising the tipple of the West Virginia Coal Co. 10 ft., and building a superstructure is now under way.

Springfield—Owing to the failure of the special sub-committee to agree, the scale committee of the miners and operators of the Springfield district, on May 27, held a perfunctory session at the City Hall. The sub-committee is expected to formulate a tentative contract governing machine mining in the near future, after which a report will be made to the general committee.

Pekin—Following the action of several of the miners of the Champion Coal Co. in filing an involuntary petition in bankruptcy against the company, Judge Jesse Black has filed an answer in the United States Court. This asserts that the assets of the company exceed liabilities by $10,000, and that it is absolutely solvent, and if relieved from the court restrictions will proceed as a going concern.

MISSOURI

Kansas City—The annual meeting of the Southwestern Interstate Coal Operators' Association will be held at Kansas City on June 9. The joint meeting of the scale committees from the association and from the three districts affected will be held later in the same week, according to present intentions.

ARKANSAS

Fort Smith—A committee, appointed by the United Mine Workers, which inspected the nonunion mines in Johnson County, will report to a general conference of operators and union miners in Kansas City on June 10. It is understood that 12 coal mines in Arkansas and Oklahoma, employing about 3000 men are to be unionized if the plans as advocated here are successful. It is further understood that negotiations have been started with the Missouri, Kansas & Texas Ry. Co., relative to the reopening of its mines at Colgate, Okla., in which 800 miners were formerly employed.

Russellville—Two hundred miners recently went on strike at Russellville, giving as a reason the failure of the mining company to comply with the state mining laws, after it had been instructed to do so by state mine inspector, Thomas H. Shaw. Efforts will be made shortly to settle the strike.

OKLAHOMA

Okmulgee—Col. J. L. Peacock, while drilling for oil upon one of his holdings, recently struck a rich bed of coal at a depth of 1200 ft. This fuel is of excellent quality, and the deposit is several feet in thickness.

Owners and operators of coal mines in the segregated mineral belts of the Choctaw and Chickasaw nations after Aug. 1 next, upon the order of the Department of the Interior, and at the suggestion of the Bureau of Mines, will not be allowed to use any but permissible explosives in carrying on mining operations.

McAlester—A six-man team of coal miners from Savanna recently won the silver trophy cup offered by operators and miners in the McAlester field for the best showing in mine rescue work. Nine teams, in addition to two boys teams and one ladies team, were entered in this contest.

FOREIGN NEWS

Leeds, England—Eleven coal miners were killed and a numbers of others injured, May 30, by an explosion of gas in the Silkstone colliery at Wharncliffe. The accident occurred at a time when the full force of miners were not at work.

Sabinas, Mexico—Acting on what they declared were direct orders from General Carranza constitutionalist officials on May 27 confiscated five coal mines. These mines, owned by French and American capitalists, are the largest in Mexico. At constitutionalist headquarters, at Piedras, it was stated that these mines will be operated as public property.

PERSONALS

W. A. Lama, formerly traveling salesman for the Hocking-Domestic Coal Co., of Athens, Ohio, has accepted a similar position with the Hatton Brown Co., of Columbus.

George F. Hart, treasurer of the Guardian Savings & Trust Co., of Cleveland, it is reported has been appointed receiver of the Goshen Coal Co., of New Philadelphia, Ohio.

Colonel I. V. Dye for several years connected with the Coal & Coke Ry. as General Freight and Passenger Agent, has been appointed General Manager to succeed J. M. Smith resigned.

Willis T. Thomas has been appointed general superintendent of the Iowa District of the Consolidated Indiana Coal Co., with headquarters at Electra Mine near Melcher, Iowa, in full charge of the operation and maintenance of the property.

Andrew Leckie, who has for some time acted as superintendent of the Panther Coal Co., at Panther, W. Va., has resigned his position and accepted the agency for the McBee Powder Co., of Pittsburgh, for the southwestern portion of West Virginia.

Upon the application of S. A. McManigal, president, W. S. Courtright has been appointed receiver for the W. J. Hamilton Coal Co., of Columbus. Mr. Courtright was formerly president of the Union National Bank and was recently elected vice-president of the W. J. Hamilton Coal Co.

Frank C. Bevans, who has been superintendent of several mines in the Pittsburg, Kan., coal district, has been made manager of the city of Mulberry, the appointment effective June 1 Mr. Bevans will conduct the affairs of the town as he would a private business, and will have supervision over both the municipal electric light and water plants.

At the annual meeting of the South Wales Branch of the Association of Mining Electrical Engineers, Sydney, F. Walker was presented with a testimonial, in the shape of a handsome gold watch, by the members of the branch, "as a token of their esteem and respect," in connection with his presidency for the first four years of the Association's existence.

Following the resignation of Everett Drennen, as manager of the Elkhorn Division of the Consolidated Coal Co., the following promotions effective June 15 are announced; G. M. Gillette will become manager of the Elkhorn Division; Jonathan Jenkins is promoted to assistant manager of the Elkhorn Division; and Garner Fletcher becomes manager of Millers' Creek Division, vice G. M. Gillette transferred.

Tim McDonough, mine guard at Irwin, Penn., recently dove down a 400-ft. mine shaft to the successful rescue of Tony Andy aged two, who accidently toppled into the shaft. After seizing the child McDonough after striking the side of the shaft finally got hold of the cable sliding down it to the top of the cage from whence he climbed to the landing. He sustained several broken ribs, a broken ankle and concussions about the entire body. The child he rescued was unharmed.

Trade Publications Received

Walter A. Zelnicker Supply Co., St. Louis, Mo. Bulletin No. 153, "Special Offerings and Other Used Material."

Borroughs, Wellcome & Co., London, Eng. "The Age of Speed;" 57 pp., 4x6½ in., illustrating Tabloid first-aid supplies.

Wilson-Snyder Centrifugal Pump Co., Pittsburgh, Penn. "Wilson-Snyder High Efficiency Centrifugal Pumps;" 40 pp., 6x9 in., with many illustrations and curves.

Keystone Lubricating Co., Philadelphia, Penn. "119" for Lubricating Mine Car Wheels. Folder of 8 pp., 3½x9 in., describing the use and advantage of "119" Keystone grease.

New York City—The Second International Exposition of Safety and Sanitation will be held Dec. 12 to 19, 1914, in the New Grand Central Palace, under the auspices of the American Museum of Safety, 29 West 39th St., this city.

CONSTRUCTION NEWS

Logansport, Penn.—The Shawmut Mining Co. is reported planning two new mines on the opposite side of the Allegheny River from Logansport. It is said that $800,000 will be expended in opening these properties.

Hamilton, Ohio—The Cincinnati, Hamilton & Dayton R.R. will soon begin the erection of large coal docks at Hamilton, to be located on the site of the old round house which will be removed to a new location. The improvemnts at this point will mean an expenditure of $100,000.

Sandusky, Ohio—The large docks of the Pennsylvania R.R. Co., at this point are nearing completion and will be put into service soon. When the docks are completed the capacity of the loading machinery will be increased three-fold. A force of 400 men has been at work on the new docks.

Columbus, Ohio—The Essex Coal Co. of Columbus is opening two mines on the Kanawha & Michigan R.R. about a mile apart in the Pomeroy district. These mines will have a combined capacity of 3000 tons per day. About $150,000 is to be spent on improvements by the company which anticipates building about three miles of railroad.

Fairmont, W. Va.—To augment the power furnished the Monongahela Valley Traction Co., the Consolidation Coal Co. will shortly add to its central power plant a 1000-kw. gas engine unit. A contract for this equipment has been let and shipment of the machinery is guaranteed for Sept. 9. It is expected that the erection should be completed in the month of October.

Fleming, Ky.—The Pottersfork and Yount's Fork branches of the Louisville & Nashville R.R. into Haymond and Hemphill, new cities of the Elk Horn Mining Corporation, will be

completed within a week and the shipping of coal begun on a considerable scale. Already nearly 200,000 tons of coal awaits the completion of these branches, while lively mining activities continue.

Floodwood, Ohio—Ground has been broken for the big central power station to be erected by the Ohio Electric Power Co. for the purpose of supplying electric current to the numerous coal mines in this section of the Hocking Valley district. It is expected that the plant will be in operation by late fall, so far as to be able to furnish current to a number of mines.

Scranton, Penn.—The contracts for the purchase of 750 new steel hoper coal cars that will cost $350,000, by the Delaware, Lackawanna & Western R.R. Co. were let on May 29. This order of coal cars is one of the largest ever placed by the Lackawanna. The American Car & Foundry Co., of Berwick, was awarded the contract for 400 of the new cars, while the Cambria Steel Co., of Johnstown, got the remainder of the order, 350 cars.

Duluth, Minn.—The Reiss Coal Co. is erecting a new unloading rig on its dock No. 1 at West Superior. This will be the second largest unloader on the lakes. Erected by the Heyl & Patterson Co. the rig will be 100 ft. high and will have a 450-ft. span handling an 8-ton clam shell bucket.

The United States Steel Corporation's unloading dock at Duluth will be widened 300 ft. this season and three more, Mead-Morrison rigs with 3-ton buckets will be installed. This extra dock capacity will take care of the coal supply for the steel plant at New Duluth.

The Great Northern Power Co. at Thompson, near Duluth, is installing more machinery and increasing its power by one unit, which will give this firm one-third greater power output. The application of electricity to almost all the large coal unloading docks in Duluth and Superior created the necessity for more power.

NEW INCORPORATIONS

Denison, Ohio—The capital stock of the Union Coal & Fire Clay Co. has been increased from $10,000 to $100,000.

Columbus, Ohio—The Maynard Coal Co. has filed amended articles of incorporation increasing its capital stock from $181,000 to $350,000.

Norfolk, Va.—The Norfolk & Chesapeake Coal Co. has been organized in West Virginia with a capital stock of $100,000. Tazewell Fitzgerald of Norfolk, Va., is statutory agent.

Columbus, Ohio—By a number of amendments filed by the Maynard Coal Co., of Columbus, with the Secretary of State the capitalization of the company has been increased from $200,000 to $350,000.

South Bend, Ind.—The I. S. C. Co., of South Bend has been organized with a capital stock of $20,000 for the purpose of coal mining. The directors are Thomas W. Slick, J. K. Glasgow, and W. A. Slick.

Toledo, Ohio—The Ohio Gas, Light & Coke Co. has been incorporated with a capital stock of $250,000 for the purpose of manufacturing gas. The incorporators are Joseph A. Sloan, J C. Vanderbroeck, B. A. Sloan, G. B. Orwig and L. A. Sloan.

Volga Post Office, W. Va.—The Little Mountain Coal Co., of Peel Tree, Barbour County, has been organized to mine and sell coal. The capital stock is $50,000 and the incorporators are B. C. Buffington, Albert Wostenholme, of Fall River, Mass., C. R. Lynch and E. P. Gosling, of Newport, R. I., and Robert A. Lynch, of Malden, Mass.

Lexington, Ky.—The Elmendorf Real Estate Co. was recently organized here. The incorporators are James B. Haggin, C. H. Berryman, James A. Todd and William F. Warren. The company is authorized to purchase and deal in coal, timber and mineral land, construct business houses, apartment houses, factories, warehouses and operate stores.

INDUSTRIAL NEWS

Duluth, Minn.—The Duluth office of the H. W. Johns-Manville Co. has been removed to larger quarters at No. 327 West First Street, in order to take care of its increased business.

Washington, D. C.—The Interstate Commerce Commission on May 27 declared that $1.85 per ton was a reasonable rate of freightage for coke from the Connellsville region in Pennsylvania to Buffalo.

Montgomery, Ala.—The Alabama Railroad Commission has postponed until June 22, the application of the Louisville & Nashville R.R. to be allowed to increase rates on coal to Decatur and New Decatur.

Toledo, Ohio—The General Western Sales Offices of the Pittsburgh-Buffalo Coal Co. will be moved to Toledo shortly. T. P. Jones, of Pittsburgh, Vice-President of the company, will be in charge of the local office.

Hamden, Ohio—The Elk Horn Coal Co., which is owned principally by C. K. Davis, of Detroit, has sold to a syndicate of Columbus men a tract of 902 acres of coal land near Hamden, which will be developed the coming summer.

Dayton, Ohio—The S. J. Patterson Pocahontas Coal Co., of Dayton, Ohio, which was incorporated recently with a capital of $75,000, has acquired a tract of 1200 acres of coal land in Mercer County, W. Va., which will be developed the coming summer.

Oklahoma City, Okla.—The Atchison, Topeka & Santa Fé has secured a five-year lease on the Oklahoma Central Ry., with the option of purchase for $2,000,000. The Oklahoma Central extends 130 miles through the Southern Oklahoma coal fields, and connects with the Santa Fé at Purcell, Okla.

Duluth, Minn.—Coal handlers employed by the Clarkson Coal & Dock Co. walked out on a strike for higher wages, May 23, but before afternoon most of the men returned to their jobs. Several agitators attempted to get the men to quit again, but were unsuccessful. The increase in pay demanded was not granted.

St. Paul, Minn.—The application of the Peabody Coal Co. of St. Louis to have the order modified under which the receivers of the Frisco system were authorized to rescind a coal contract made with the Peabody company was denied in the United States District Court May 23 by Judge Walter H. Sanborn. Exception was taken by L. O. Hawker, counsel for the coal company, and a formal appeal is in prospect.

London, Eng.—D. A. Thomas recently arriving in London on the "Lusitania", said that he had been asked by the big coal mining interests of the United States to formulate a scheme for developing their coal areas as economically as the Cambrian Trust, and that he plans to form a great United States coal trust, provided the Government does not interfere, which will reduce prices and make the United States a large coal supplying center to the world.

Toronto, Ont.—The Dominion Coal Co., of Sydney, N. S., having increased its shipping facilities intends to bring 2,000,000 tons of coal into Montreal this season or about 300,000 tons in excess of last year It has a charter list of 24 stemers with an aggregate tonnage of 168,000 and up to date has brought up 200,000 tons. One boat a day is being handled at the company's plant at Windmill Point and five boats per week at Hochelaga pier. Boats are also running with coal to Three Rivers and Quebec.

New York, N. Y.—The A. S. Cameron Steam Pump Works, 11 Broadway, New York, has opened branch offices and warehouses in the following cities: Birmingham, Ala., American Trust Bldg., H. M. Perry, mgr. Chicago, Ill., People's Gas Bldg., M. P. Frutchey, mgr. Cleveland, Ohio, Williamson Bldg., W A Armstrong, mgr Duluth, Minn., Providence Bldg., S. H. Hill, mgr. Houghton, Mich, Thos. F. Lynch, mgr. Knoxville, Tenn., Holston National Bank Bldg., L. F. Thompson, mgr Los Angeles, Calif., W. A. Townsend, mgr. Philadelphia, Penn., Arcade Bldg., Phil. Weiss, mgr. Pittsburgh, Penn., Farmers' Bank Bldg., W. B. Brendlinger, mgr. St. Louis, Mo., 300 N. Broadway, A. A. Bonsack, mgr. Seattle, Wash., Colman Bldg., R. W. Douglas, mgr.

Uniontown, Penn.—Pursuant to an order of the Court of Common Pleas of Fayette County, the Fayette Title & Trust Co., trustee under the mortgage of the Sunshine Coal & Coke Co., will offer for sale at public outcry, on Friday, June 12, 1914, at 1 o'clock p.m., on the premises at Lynn Station, the plant known as Cyrilla No. 5, and on Saturday, June 13, 1914, at 2 o'clock p.m., on the premises at Martin Station, the coke plant known as Francis No. 1. The first named plant consists of about 180 acres of Pittsburgh coal, 157 acres of surface, 142 beehive coke ovens, 23 blocks of double houses, 8 other houses, a store building, barn, tipple, engine house, engines, boilers, electrical equipment, 12 horses and mules, and all tools and appliances used in connection with the said plant. The second plant, or Francis No. 1, consists of about 120 acres of Pittsburgh coal, 330 acres of Sewickley coal, 475 acres of surface, 240 beehive coke ovens, 20 eight-room houses, two 10-room houses, two 12-room houses, 8 other houses, three shanties, store building, tipple and washer, brick boiler house, two 100-kw. generators, three 100-hp. boilers, two electric mining machines, two electric locomotives, etc.

Coal Trade Reviews

General Review

Anthracite opens the new month moderately active but will not be able to maintain the pace. Complete lethargy in bituminous. One of the largest soft-coal corporations curtailing operations for the first time in its history. No improvement is in sight before fall.

The last of the month witnessed the customary spurt in anthracite coal, but as a rule the mines are not operating at all strong, and it is doubtful if they will be able to maintain a full-time basis through the current month. A rather insistent demand at tidewater indicates that the New England trade is still capable of absorbing considerable coal, but this is confined mostly to stove size and all other sections seem to be well supplied, so that there is not much real activity. May production was comparatively good, with delays reduced to a minimum. The steam sizes are being stocked by nearly all the companies.

The soft-coal market continues in the grip of a complete lethargy. The large consuming interests are still keeping stocks down to the smallest possible margin, and propositions on the part of the operators to contract on the same basis as last year, are not favorably received. While there have been some inquiries from consumers not yet closed, the effects have been so trifling as not to influence the general market in any way. Announcement of the fact that the Berwind White Co. is working under curtailed production for perhaps the first time in the history of the concern, is significant evidence of the trend of conditions in soft coal.

Contracting in the Pittsburgh district is below normal, consumers holding off because of their light requirements and the surplus stock on hand. Price cutting is being done on both prompt and contract business, although the cuts are not heavy. As a result of a slight improvement in lake shipping, there has been a moderate increase in operations which are probably now on a basis of 60 per cent. capacity. With the Ohio operators and miners in conference under the auspices of Governor Cox, the trade is marking time pending the results. The general impression prevails that the next ten days will see the labor situation definitely cleared up. Because of the general reluctance of dealers to stock up, trade conditions have failed to improve. Complications in the labor situation in the Kanawha district will ultimately have a beneficial effect, should the deadlock prove as complete as it now seems.

Conditions at Hampton Roads are somewhat duller in spite of a fair week's dumpings. There are only a few steamers awaiting cargo, while the accumulation in the local railroad yards is rather above normal, and there are now well defined rumors of concessions on the regular circular. As a rule, the market is moderately firm, due to a rather heavy demand from north of the Ohio River, which is having a steadying influence. In the Southern trade, buyers seem to have relinquished hope of a break in the market, and now appear ready to buy. A number of the Southern railroads will also be in the market shortly, and there is a general feeling of optomism throughout the trade. Operations in the Middlewestern field are on about half-time basis, and jobbers and retailers are pressing sales unusually hard.

EASTERN MARKET

BOSTON

New low prices at New England distributing points; market cargoes continue to arrive. Light movement of contract coal, spot demand practically nil, and quotations f.o.b. merely nominal. Georges Creek and Pennsylvania grades unchanged.

Bituminous—While some of the producing interests are trying to patch up the price situation on Pocahontas and New River alongside and on cars in this territory, their efforts are thus far barren of results. New low figures are heard this week at the various distributing points and yet coal continues to come forward without disposition orders in hand. Buyers who are following the market closely are waiting for still lower prices and admittedly the argument is mostly in their favor. It is understood that the Pocahontas field is operating only three days a week but apparently a stiffer curtailment will be required before the situation can improve.

The movement of Southern coals on contract is very light. The corporations and other large buyers are postponing their usual quotas and there is continued anxiety on the part of shippers who have steamers and barges under long-term charters. Meanwhile there has been no pronounced change in quotations f.o.b. Hampton Roads on the standard coals. The demand for spot shipment to New England, however, is practically nil and quotations f.o.b. are merely nominal.

Georges Creek and the Pennsylvania coals are without any new feature. Prices are held on about the season basis, the operators apparently realizing there is a market for only so much coal anyway and what is sold will command one price about as well as another. On the part of a few shippers there has developed an inclination lately to take business at delivered prices that are competitive with Pocahontas and New River and it is reported that some comprehensive orders have been closed in that way.

Anthracite—Deliveries in May were slower than was expected and a fair number of orders will go over to June. The mines are still on full time and some of the companies feel so confident of June business that they are unwilling as yet to release their transportation for freighting bituminous. Stove is still in shortest supply and the proportion in any one shipment is held within close limits.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.90@1.50	$1.20@1.65	$1.67@1.77	
Philadelphia*	2.15@2.75	2.4 @2 90	2.92@3.02	
New York*	2.45@3.05	2.7 @3.20	3.22@3.32	
Baltimore*	.....	.....	2.85@2.95	
Hampton Roads*	.....	.....	.....	$2.80@2.85
Boston†	.....	.....	.....	3.35@3.63
Providence†	.....	.....	.....	3.40@3.73

* F.o.b. †On cars.

NEW YORK

Cancellations on bituminous orders more numerous, but market is free of demurrage and consignment coal. Anthracite slowing down as the season advances and a restriction in production expected this month.

Bituminous—The soft-coal market continues monotonously dull and if anything a trifle more flat. It is simply a case of no business whatever, and the industry will do well to prepare for a continuance of lgiht conditions until preparations for the fall trade create an increased demand. If anything, cancellations have been more numerous during the week and operations have been still further curtailed about 40 to 50% probably being the average. One of the most significant features in the situation has been the development of the fact that one of the largest and most powerful bituminous companies in the country, which has never been known to curtail operations generally, has been forced by the slack conditions to reduce to four or five days a week.

But even in the face of all these discouraging conditions, operators are as determinedly and consistently adhering regular circulars as ever. It is also a notable fact that consignment coal has disappeared almost entirely from the market, and there are scarcely any more sales of demurrage coal now reported. It is not unlikely that the producers may ultimately benefit by the present indifference on the part of the buying and consuming interests It is a well known fact that the large corporations are working with stocks reduced to the smallest possible margin, and should they adhere to this policy through the summer the opening of the fall trade will witness a sharp rush for coal. Although scarcely any spot business is being negotiated, the prompt market still continues quotable on the same basis as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.60@2.70; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—Hard coal continues to slow down steadily but easily under the compelling influence of the advancing

season, the increasing price, and the pressure incident to the general retrenchment in all lines of industrial activity. While full-time operations have so far been consistently maintained by the large companies, there are now definite signs of a slowing up, and it is highly improbable that they will be able to hold out through the current month. The holidays Saturday of last week and Monday of this week, were generally welcomed by the operators.

Stove coal continues strongest, being in sharp demand at all points. In the all-rail trade both egg and stove are in good demand. At tidewater egg is moving fairly well, although individuals are forced to sell at a sacrifice. Nut cannot be moved at all. Pea is in weak demand, and operators are avoiding sending it down as much as possible. In the steam grades, buckwheat is as demoralized as ever, while the cheaper grades of rice are almost as bad. Individual operators who have no contracts for barley are dumping it on the culm bank rather than send it down to tide.

We now quote the New York hard-coal market, on which the new June circular is in effect, on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$4.80	$4.55@4.80	$4.75	$4.50@4.75
Egg	5.05	4.95@5.05	5.00	4.85@5.00
Stove	5.05	5.05	5.00	5.00
Chestnut	5.30	5.10@5.30	5.25	5.00@5.25
Pea	3.55@3.60	3.45@3.60	3.45@3.50	3.10@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.10@2.75
Rice	2.30	2.25@2.30	2.00@2.25	1.65@2.25
Barley	1.80	1.60@1.80	1.70@1.75	1.30@1.75

PHILADELPHIA

Anthracite market still lacks tone; mining continues full time, but demand for steam sizes is falling off. Slight improvement noted in bituminous, but curtailed operations still in force.

Anthracite—The first week in June finds this branch of the trade in fairly good condition. While there has been talk of suspension of mining, due to the preponderance of small sizes, operations continue as yet, and extra efforts are put forth to take care of the surplus. The New England market, judging from the demand at Tidewater, can still handle considerable coal, but the demand centers on stove coal. Chestnut seems to be the disturbing factor. This has usually been handled by diverting this size to the lakes, but it is doubtful whether this policy can be carried out because of the large stocks in the Northwest.

The month of May, as far as production is concerned, is likely to equal if not exceed, the tonnage of the corresponding period of last year, but it is doubtful if June shipments will equal those of last year. An inducement in the way of the usual discount seems to have small weight with the domestic trade now. Retail dealers find, with but few exceptions, that householders are postponing deliveries until later in the season, and this is naturally reflected in the wholesale market. It is believed, before the month is out, that partial suspensions will be necessary.

Quotations at Tidewater are as follows:

	Circular	Individual
Broken	$4.45	$4.45
Egg	4.70	4.70
Stove	4.70	4.80
Chestnut	4.95	4.70 @ 4.85
Pea	3.25	3.00

Bituminous—There is some inquiry by establishments that have not as yet closed their contracts, but are shopping around the market trying to secure some cheap coal. This has had a tendency to tighten prices, but the difference is trifling. A sale in sight, can usually secure coal at prices prevailing for the last couple of months, and it is possible to secure good bargains, by looking the market over carefully. Propositions to close contracts at the same basis as last year, are not looked on with favor, and few large ones have been booked as yet.

BALTIMORE

The trade generally lacks vigor. Bituminous coal occasionally offering at below cost. Export outlook continues excellent. Anthracite slow but even.

There is a general absence of snap and vigor to the trade. Bituminous coals are offering at times below the profit line, and buyers undoubtedly have all the best of it. Quotations depend largely upon the exigencies of the particular deal.

On forced sales in West Virginia the past week, slack was sold at from 45 to 55c. Three-quarter gas coal was weak, with some sales around 80 and 85c. The West Virginia steam fuels were freely offering at from 85 to 95c. The Pennsylvania situation on bituminous was a little steadier although there was plenty of medium grade fuel to be had at from 95c. to $1.10. Export coal was a strong feature straight through. During May the total exports exceeded 83,000 tons, an increase of about 9000 tons over the month previous. With the large number of charters already announced for June loading the May figures are expected to be exceeded.

In anthracite the supply is even, and a fair seasonal trade is being done although it does not come up to some previous years. Most dealers call conditions slow, but believe that the middle part of the summer will come well up to former seasons. An increase of 7c. per ton on inside the cape deliveries was announced to the trade here the present week. The new rate for deliveries in Baltimore Harbor and to points along the Patapsco River and Chesapeake Bay will be $1.42.

CENTRAL STATES

PITTSBURGH

Slight increase in production, the district operating at about 60% capacity. Considerable contracting at cut prices. Slack being stocked by leading interest. Connellsville coke dull with prices irregular. Shipments and production equal, after two months of production exceeding shipments.

Bituminous—There has been no improvement in the local demand for coal, but a slight increase has occurred in Lake shipments, so that mining operations have increased slightly, and may average a trifle in excess of 60%, taking the Pittsburgh district as a whole. One leading interest reports its operations at 85% as heavy as a year ago, when it was doing quite well. There is a moderate amount of contracting and some of the contracts are taken at materially lower figures than those expiring. On the whole, contracting has not been as active as a year ago, some buyers showing a tendency to hold off because their requirements are light and they still have some stocks. Some interests report that their contracts taken from the beginning of the year to date are substantially as heavy as the business done in the same period last year. For prompt coal regular list prices are cut more than on contracts, but there is cutting even in contracts for slack, which is usually supposed to hold to the full price in the case of twelvemonth contracts because the shipper has relatively little slack in the winter when there are no lake shipments. The Pittsburgh Coal Co. has long followed a practice of stocking slack during the lake-shipping season, and began doing so last week. Its attitude is that it will not shade the 90c. price on twelvemonth contracts for slack. Subject to some cutting on contracts and more on prompt lots we quote regular circular prices as follows: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50, per ton at mine, Pittsburgh district.

Connellsville Coke—The market continues extremely quiet, considering that nearly all contracts expire at the end of this month, and in ordinary times there would now be a great deal of contracting for delivery beginning July. There are a few inquiries for both furnace and foundry coke, but concessions from the nominal market are so common that buyers have difficulty in making up their minds. The market stands substantially as follows: Prompt furnace, $1.80@1.90; contract furnace, $1.85@2; prompt foundry, $2.35@2.50; contract foundry, $2.35@2.65, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended May 23 at 257,630 tons, a decrease of 37,085 tons, and shipments at 276,072 tons, an increase of 242 tons. Shipments exceeded production apparently by 18,442 tons, the balance having been in the opposite direction for eight weeks previous, to the total amount of 84,860 tons.

BUFFALO

Much bituminous still in consumers' hands. Railroads likely to require more coal before long. Coke still quiet. Fair movement of anthracite.

Bituminous—There is some indication that the railroads will be in the market for more coal before long. The Grand Trunk is estimated to have a month's supply, but the Lackawanna has about used up its surplus, while the Lehigh Valley still has some, but no great amount. Some contracts are making, but as a rule the buyer asks that delivery be suspended for a month or so. All bituminous mines are obliged to run on short time, often not more than two or three days in a week. As a rule the operators are cautious, not allowing their output to exceed orders. There is complaint that buyers are not above throwing up purchases if they are offered demurrage coal at sacrifice prices.

Buffalo is taking a good amount of coal. The ore receipts by lake are fair for the season and the iron furnaces are practically all active. Canada is not absorbing a normal amount of coal and there are reports that pig iron is selling slower at other points than here. All private factories are running at a slow rate, but only a few of them are shut down.

Although dealers commonly report business dead, when asked if he has cut prices he is pretty sure to reply that he has not.

So long as certain of the bituminous dealers maintain that they are getting full prices for their coal, the circular will have to be given as the proper basis, no matter if it is well known that a great part of the coal is selling for less. Quotations will therefore be on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with slack no more active than sizes. Allegheny Valley prices are about 25c. lower, except slack, which sells on a par with most Pittsburgh slack.

Coke—There are still reports of furnaces in this district blowing out, so there can be no greater activity in the coke market and none is looked for at present. The pig iron product of Buffalo and neighboring furnaces is selling fairly well. Best 72-hr. Connellsville foundry coke sells at $4.50.

Anthracite—There is not much real activity to the trade, as the consumers, even in the country, are well supplied. A slight spurt took place on the rail lines at the close of the month as usual, though it was much smaller than the average. Shipments by lake are much smaller than the average, though the present showing is fair. Some winter-loaded cargoes are still here, as the vessels are not anxious to sail. Shipment for the week (six days) amounted to 125,000 tons.

TOLEDO

Increase in the lake movement and an improvement in the steam demand injects a better tone into the trade. Supplies still excessive, however, and prices ruling low.

There is more lake coal moving than for some weeks past. A number of large freighters have cleared this week, and others are now in the process of loading. There is plenty of coal in the yards and no scarcity is noticeable in any line save Pocahontas which is hard to get in nut and egg sizes. The usual 20c. advance on Pocahontas was announced June 1.

Outside of smokeless coal there is plenty of fuel on the Toledo market despite the fact that the Ohio mines have been closed for two months. It is generally believed that the mines will again be running by the middle of June. West Virginia coal is taking the place of southern Ohio grades. Outside of Pocahontas there has been no change in quotations and most concerns claim to be getting circular prices for what coal they sell.

Crop prospects in Ohio are unusually good and it is probable that there will be a heavy demand for threshing coal. Factories are running as usual and it would appear that the demand for steam coal must be large as soon as the supply purchased in anticipation of the strike runs out which must be soon. Domestic demand is light but it will soon be time for the laying in of anthracite at summer prices.

CINCINNATI

Market increasingly dull, with slower demand for domestic grades and a continued slackness in steam coal. Lower prices are indicated, although it is hoped that the West Virginia strike will shortly stimulate the market.

Contrary to the expectations, the market in this vicinity has failed decidedly to improve. Reports from the upper lakes indicate that while the docks are being slowly cleaned up, there is great difficulty in getting boats to handle shipments, as return cargo of ore cannot be had at this time. The domestic demand is threatening to slump off both here and throughout the state, reports being to the effect that dealers are inclined to delay stocking until later on. They are also hopeful of getting even lower prices than now offered, which in many cases are already below circular figures.

The strike in the Kanawha field is confidently expected to result in a marked stimulation, however, as it will cut off a large part of the present surplus, and make the entire market dependent upon a comparatively small part of the West Virginia and the eastern Kentucky fields, with what river coal is available. As this means a heavy reduction in the supply, the trade has every reason to hope for a stiff reaction shortly, probably during this week, if conditions are not changed.

COLUMBUS

Attention centered on conference of operators and miners. In the meantime practically all Ohio mines continue idle. Slight increase in the demand for coal in some sections.

Since Governor Cox has taken a hand in the mining suspension in Ohio, the conference of the operators and miners is expected to produce some tangible results. Miners in certain districts are more anxious than ever before to compromise and the same is true of the operators.

Miners in certain localities are not backing up their officers and open friction is reported. It is hinted that a compromise of a rate some place between 44c. and 49.64c., which is the figure insisted upon by miners for machine mined coal on the mine-run basis, may be effected.

There is a slight increase in the demand for coal, due to the depletion of surplus stocks. This is especially true of the larger steam users and as a result a considerable tonnage has been shipped into Ohio from West Virginia and Kentucky. Prices on these shipments have been very low, however. Not a great deal of inconvenience has been caused up to date and none of the manufacturing plants have had to close.

There is also a better demand for domestic sizes, especially the fancy grades such as Pocahontas and splints. Some of the larger householders are laying in a good supply of fuel and dealers have had a fair trade for this season of the year. The lake trade shows no strength of consequence. Reports from the upper lake ports are that a considerable tonnage has been carried over from last season and as a result shipments to the Northwest via the lakes are not large.

A few of the smaller mines in the Pomeroy and Crooksville districts have resumed operations and signed up at the 49.64 scale. But these are not important and will have little bearing on wage scale negotiations.

What quotations are being made in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$1.50@$1.40		$1.50@$1.40	$1.45@$1.40
¾-inch	1.35@ 1.30	$1.20@$1.15	1.35@ 1.30	1.30@ 1.25
Nut	1.30@ 1.25		1.25@ 1.20	1.25@ 1.20
Mine-run	1.15@ 1.10	1.10@ 1.05	1.15@ 1.10	1.10@ 1.05
Nut, pea and slack	0.85@ 0.80		0.85@ 0.80	0.80@ 0.75
Coarse slack	0.75@ 0.70	0.85@ 0.80	0.75@ 0.70	0.70@ 0.65

CLEVELAND

Prices just holding their own at the low level. Reserve supplies mostly used up, but the demand still off. The lake trade quiet and damage at Duluth-Superior docks has reduced shipments.

The spot market shows little change and the range of prices is about the same. Youghiogheny slack is selling on track here at $1.60@1.65 and Fairmount gas slack the same. There is no demand for coarse coal. Storage stocks at the factories have been depleted in most instances, but the plants are not working to capacity and the demand is therefore dull.

The real interest in the Cleveland market centers on the joint conference of operators and miners at Columbus. It seems likely a settlement of the Ohio strike will be made shortly and the rate will probably be somewhere near the mine-run basis of western Pennsylvania. So far no contracting of any consequence has been done for Ohio coals, and as the season is well advanced, operators are getting anxious.

Pocahontas operators and jobbers are quoting lump and egg at an advance of 10c. over May prices. They are not taking any more orders than they can help for prepared sizes. Slack is not readily disposed of and mine-run orders are scarce. The local market will not take much Pocahontas until the latter part of this month when domestic deliveries begin.

Lake Trade—Lake shippers are having no difficulty getting all the boats they can use. The smaller type of vessels was not equal to the demand a few weeks ago, but with the rush over, ship owners are willing to hold boats two or three days to get coal cargoes. The lake trade has opened very slowly, but a slow start usually results in a rush in the fall.

A sudden gale last Monday toppled over several unloading machines at Duluth-Superior. The Northwestern Fuel Co. was the hardest hit when its new dock was wrecked. Practically every dock at the head of the lakes suffered some damage and the entire Clarkson dock was put out of commission. As a result of this damage, shipments amounting to nearly 750,000 tons will be deferred.

Shipment prices are as follows:

	Pocahontas	Youghiogheny	Fairmount
Lump	$3.15		
Lump, 1¼-in.		$2.35	
Lump, ¾-in.		2.25	$2.10
Mine run	2.60	2.10	2.00
Egg	3.15		
Nut		2.15	
Slack	2.20@2.35	1.60	1.65

DETROIT

Business quiet but a more hopeful feeling prevails. Surplus stocks are being gradually exhausted and consumers are now looking for tonnage.

Bituminous—There is a noticeable change for the better in the situation here. Not so much from actual sales as from the general feeling that business is sure to improve shortly. Inquiries are coming in from a great many steam coal consumers which denotes that the buyers are beginning to notice their supply is diminishing rapidly.

The supply of track coal is steadily becoming less, al-

though there is sufficient to satisfy all possible demands for some time to come. The demand for slack has shown some improvement and prices have been much better than for some weeks. About the same conditions exist on the coarser steam coals, except that quotations are still off on mine-run and 1¼-in. lump. Should the Ohio mines remain closed for a few more weeks the general feeling is that prices on all grades of West Virginia and Kentucky coal will show an advance.

In the domestic trade, the situation has changed but little. However, there have been some fair orders on 2-, 3- and 4-in. lump and some egg. Some of the shippers report more success in getting the dealers in the smaller towns to place orders; this is especially true of some of the large dealers, who figure that at current prices they are making good bargains. The threshing season is not far away and some of this coal will move during July.

Anthracite—The anthracite business is still quiet in Detroit, at least from shippers' end. There is, however, quite a large amount being delivered, mostly to apartment houses and churches.

HAMPTON ROADS

Situation somewhat duller in spite of a fair week's dumpings. Few steamers waiting, accumulation on hand rather large and there are well defined rumors of concessions on the circular.

While conditions at tidewater are not extra bright at the same time there has been a fair amount of coal dumped during the week. The greater part has gone to the Northern ports with one large cargo loaded by the government into the collier "Cyclops" for the fleet now in Mexico. The largest shipment foreign was taken by the Italian S.S. "Vesuvio" for Genoa. Other foreign cargoes moved to Canal Zone, Naples, Havana, Dakar, Venice, St. Thomas and Barbadoes.

In addition to New River and Pocahontas there has been some shipments of high volatile to the New England market but only one or two small cargoes and these it is understood were on contract. The accumulation of cars on the railway yards is somewhat above the average with little tonnage in the stream waiting for berth.

Although there is no confirmation it is understood that some sales are being made below regular circular the price on some small parcels being cut to $2.70 or even a few cents less. As has been the case for some time the greater part of the shipments moving have been by steam barge the schooner movement being fairly light.

LOUISVILLE, KY.

Large demand from north of the Ohio River has stimulated the market. Most operators able to keep up operations fairly steady. Prices steady.

An increased demand for domestic coals has greatly improved the situation in the eastern Kentucky field, though the dullness continues in the western part of the state. Large shipments are being ordered daily for points north of the Ohio River. Domestic coals continue sluggish in the western part of the state, with a corresponding tightness of the steam sizes and screenings. Industrial demand is not improving to any extent. Many of the operators are booked well ahead for later deliveries and are finding it possible to keep operations going with a fair degree of regularity. The settlement of the labor differences in the western part of the state does not appear to have had any effect on the market.

Prices show some advances on the domestic coals, those which sold during May around $1.40 a ton, f.o.b. mines, having made about a ten-cent advance The steam sizes in the eastern field show little change, though in the western district pea and slack is quoted at from 40 to 50c. a ton and the nut and slack from 65 to 75 cents.

SOUTHERN AND MIDDLE-WESTERN

BIRMINGHAM

Navy business helps Alabama market. Coke somewhat stronger and lump coal outlook more encouraging. Number of Southern railroads will contract during June.

There is a general feeling of optimism among Alabama coal men. This is due in part to the fact that the Navy is reported to be in the market for a large amount of Pratt steam coal and as soon as the order is placed the Blue Creek mines will have to run full-time.

A two-year contract has been received from a New Orleans concern for a large tonnage of byproduct coke which has been found to be superior in many ways to the old beehive product. A good tonnage of coke is also going to Western points.

As the retail dealers have not found the operators willing to cut prices on lump, it is expected they will soon begin to put in their summer stocks; a 10c. advance went into effect June 1 and another 10c. is scheduled for the first of July. A number of the Southern railroads let their annual fuel contracts during June and Alabama mines will receive a large share of this business.

INDIANAPOLIS

Mines on about half-time and trade at normal summer basis. Largest consumers in market again, but all the surplus coal not consumed yet. Retailers active in pushing summer sales.

Indiana mining conditions are not much changed. Here and there a mine is reopened, but this seems to be offset by more restricted operations at the plants which have been working. Production seems to be at about half capacity. Not all the stored coal is yet cleaned up, although a majority of the large consumers are in the market again. The wage troubles in this state are settled, except at the five strip mines, which employ about 200 men. This is a new element that has now to be considered, the business beginning to assume some importance. The mine workers association is recognizing these miners and will represent them in making a wage agreement.

Retailers all over the state are pushing sales unusually hard on the expectation that there will be a car shortage next fall and early winter. The movement to consumers' bins is perhaps a little more than normal for the season. In fact, the number of users of the domestic grades who buy their winter's supply in summer seems to grow year by year.

ST. LOUIS

Coöperative mines a disturbing feature in the middlewestern situation. Market generally dull and unsatisfactory.

Continued quietness covers the local situation. There is practically no coal moving, with the exception of a very small tonnage for steam, and this sells at anything but a profitable figure. Several of the mines in the 5th and 9th Districts are going on the coöperative basis.

The United Mine Workers seem unable to contract their mines in the 5th and 9th Districts, and the operators are making a proposition to the men to put the mines on a cooperative basis. The miners pay the operators so much a ton royalty in some instances, and so much per ton for the use of the property, and put the coal on the market at whatever figure it will bring. It is figured by some operators that the miners are producing coal for about 38 to 41c. a ton, whereas the scale is about 55c. This, of course, practically puts a quietus on any operations other than those on a coöperative basis, which is bringing about a demoralization in these districts.

At the present time nearly one-fourth of the mines in Williamson County are bankrupt, and according to rumor some of the operations in the Franklin County field are likely to follow.

There is a small tonnage of anthracite coming into the St. Louis market, and smokeless is also beginning to move in. Some outside coke has arrived during the past week, or ten days, but other than that the market is quiet.

The market is now quotable as follows:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	.....	$1.20	$0.85 @ 0.90	$1.15
3-in. lump	.....	.....	1.25	.....	.....
6-in. lump	$1.20 @ 1.35	.....	1.30	1.00 @ 1.10	1.35
Lump and egg	1.85 @ 2.15	$2.00	.....	.....	1.15
No. 1 nut	1.20 @ 1.35	.....	.....	.....	.....
Screenings	0.80 @ 0.85	.....	.....	0.65 @ 0.70	0.75 @ 0.80
Mine-run	1.10 @ 1.20	.....	.....	0.80 @ 0.85	.....
No. 1 washed nut	1.50	2.25	1.50	.....	.....
No. 2 washed nut	1.40	.....	1.25	.....	.....
No. 3 washed nut	1.25 @ 1.30	.....	.....	.....	.....
No. 4 washed nut	1.25 @ 1.30	.....	.....	.....	.....
No. 5 washed nut	0.80 @ 0.85	.....	.....	.....	.....

The June circular at St. Louis will be as follows:

Anthracite—Chestnut, $8.20; egg and stove, $7.95; grate, $7.70; Arkansas semi-anthracite, $6.50.

West Virginias—Lump and egg, $5.50; nut, $5; mine-run, $4.75.

Illinois Coal—Carterville lump and egg, $3.25; Mt. Olive lump and egg, $2.75; Standard lump, $2.50.

KANSAS CITY

Movement of coal improved due to preparations for threshing wheat. Steam lines in good demand. Lump still weak, and moving slowly.

Preparations for harvesting big wheat crops in Kansas and Oklahoma has resulted in more snap to the coal trade

in Kansas City. Cutting already has begun and will continue for the next six weeks. Threshing will start up about June 15, and will lap over into July and August.

The movement into Kansas and Oklahoma is already showing improvement, though the bulk of the business will be handled in the next few weeks. Missouri threshermen are also buying coal, though Missouri products are so diversified that wheat is only one of a number of crops and coal demand is therefore lighter than in other states. Lump is still showing lethargy, and concessions are being made in order to move it.

PORTLAND, ORE.

Demand light as result of warm weather. Storage prices went into effect June 1, with reduction of 50c. per ton.

The market is exceedingly quiet and dealers are not looking for much activity till after summer prices go into effect. This will mean a reduction of 50c. per ton and it is expected that this will result in a considerable volume of business.

Whether or not the hope of lower fuel prices, as a result of the opening of traffic through the Panama Canal will deter consumers from placing orders early, is a question that only time will answer.

PRODUCTION AND TRANSPORTATION STATISTICS

BITUMINOUS COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during March and the first three months of the last two years, in short tons:

	March		3 Months	
Anthracite	1913	1914	1913	1914
Baltimore & Ohio[1]	77,049	149,483	434,392	407,542
Chesapeake & Ohio[1]	309	945	2,167	3,051
Erie[3]	672,153	740,234	1,958,048	2,128,608
Pennsylvania[1 3]	741,209	1,086,344	2,743,504	2,706,391
Virginia[2 1]	166	43	311	102
Total 5 roads	1,490,886	1,977,049	5,138,422	5,245,694
Bituminous				
Baltimore & Ohio[1]	2,710,031	3,338,058	8,531,184	8,952,917
Buffalo, Roch. & P.[1 2]	766,576	923,513	2,293,627	2,495,420
Buffalo & Susq.[1 2]	155,706	150,187	450,064	432,926
Chesapeake & Ohio[1]	1,392,590	1,596,093	3,961,230	4,390,821
Erie[3]	61,538	6,096	184,852	28,203
Hunt. & Br'd T. Mt.[1 2]	102,337	127,110	381,600	329,957
New York Central	770,165	918,706	2,443,985	2,492,765
Norfolk & Western[1 2]	1,751,158	2,112,118	5,694,576	5,744,407
Pennsylvania[1 3]	4,050,247	4,740,313	12,117,747	12,414,492
Pitts. & Lake Erie[1 2]	956,138	1,304,413	2,909,651	3,090,822
Pitts. Shaw. & North[1 2]	229,341	256,971	681,982	791,255
Virginia[1 2]	380,091	336,952	1,233,244	1,003,817
Western Maryland	271,286	285,601	760,985	751,045
Total 13 roads	13,597,204	16,096,131	41,644,727	42,918,847
Coke				
Baltimore & Ohio[1]	405,220	356,164	1,215,751	896,499
Buffalo, Roch. & P.[1 2]	55,911	28,878	164,007	79,699
Buffalo & Susq.[1 2]	27,401	41,162	77,763	110,859
Chesapeake & Ohio[1]	32,207	40,658	92,614	111,108
New York Central	5,775	.....	17,429	.....
Norfolk & Western[1 2]	147,730	103,070	448,828	317,684
Pennsylvania[1 3]	1,247,451	1,027,339	3,756,325	2,700,237
Pitts. & Lake Erie[1 2]	612,095	521,626	1,859,847	1,341,139
Pitts. Shaw & North[1 2]	3,084	.....	9,292	.....
Virginian	.....	.....	.....	.....
Western Maryland	6,381	9,402	19,038	24,138
Total 10 roads	2,543,255	2,128,299	7,660,894	5,581,363

[1] Includes coal from connecting lines.
[2] Includes company's coal.
[3] Does not include company's coal hauled free.

Note:—The Southern Railway hauled 292,179 short tons of bituminous coal during February, and 648,842 short tons during the two months.

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during March and April of this year and last year:

	March		April	
	1914	1913	1914	1913
Coal	3,173,972	2,538,039	2,131,812	2,516,367
Coke	356,164	405,220	343,862	400,317
Total	3,530,136	2,943,259	2,475,774	2,916,684

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for April and the four months of 1913 and 1914, in short tons:

	April		Four Months	
	1914	1913	1914	1913
Anthracite	1,070,562	930,592	3,776,953	3,674,096
Bituminous	3,699,928	3,796,432	16,114,420	15,914,179
Coke	916,369	1,230,979	3,616,606	4,987,304
Total	5,686,859	5,958,003	23,507,979	24,557579

VIRGINIAN RAILWAY

Total shipments of coal over this road for the month of March was 336,552 tons as compared with 380,091 tons for the same month last year.

COAL FREIGHT DECISIONS

I. C. C. No. 4762—Poehlman Bros. vs. Chicago, Milwaukee & St. Paul Ry.

Defendant's rate of 40c. per ton, applicable from Galewood, Ill., to Morton Grove, Ill., on interstate shipments of coal received from connecting lines at the former point not shown to be unduly discriminatory or prejudicial. The traffic involved is through traffic. The through rate is not drawn in question, nor are the participating carriers made defendants. The Commission therefore declines to express any opinion upon the question of the reasonableness of the rate under attack. Complaint dismissed.

COAL SECURITIES

The following table gives the range of various active coal securities during the week ending May 30:

	Week's Range			Year's Range	
Stocks	High	Low	Last	High	Low
American Coal Products	85½	85	85	96¼	82
American Coal Products Pref.	....	....	105	106	102
Colorado Fuel & Iron	28¼	27⅞	28	34½	24
Colorado Fuel & Iron Pref.	....	....	140	140	140
Consolidation Coal of Maryland	....	....	102¼	....	....
Island Creek Coal Com.	48½	48½	48½	....	....
Island Creek Coal Pref.	86¾	86¾	86¾	....	....
Lehigh Valley Coal Sales	170	150	165	....	....
Pittsburgh Coal	19½	19½	19½	23½	17⅞
Pittsburgh Coal Pref.	89	88	88⅝	93½	84
Pond Creek	18¾	17	17½	....	....
Reading	166½	165½	166	172½	158½
Reading 1st Pref.	89	89	89	89	87½
Reading 2nd Pref.	89	89	89	93	87½
Virginia Iron, Coal & Coke	..	..	45	52	40

	Closing		Week's Range		Year's
Bonds	Bid	Asked	or Last Sale		Range
Colo. F. & I. gen. s f.g. 5s	90½	99	92	May '14	91½ 99
Colo. F. & I. gen. 6s	105	..	107½	June '12	.. ..
Col. Ind. 1st & coll. 5s. gu.	73½	75	73¾	75	73 82
Cons. Ind. Coal Me. 1st 5s	..	74	73	Mar. '14	73 79
Cons. Coal 1st and ref. 5s	89	91½	90½	90½	89 90½
Gr. Riv. Coal & C. 1st g 6s	80	..	99½	Feb. '14	99⅛ 99⅛
K. & H. C. & C. 1st s f g 5s	..	..	102¾	Apr. '06	.. ..
Pocah. Con. Coll. 1st s f 5s	89½	..	93	Mar. '14	93 93½
St. L. Rky. Mt. & Pac. 1st 5s	86½	87¾	87½	May '14	84 88½
Tenn. Coal gen. 5s	78	80	77	Apr. '14	77 82
Birm. Div. 1st consol. 6s	103	..	103½	May '14	97½ 103½
Tenn. Div. 1st g 6s	101⅜	103	101¾	May '14	101½ 103
Cah. C. M. Co. 1st g 6s	101⅜	103	102	Mar. '14	101 102½
Utah Fuel 1st g 5s	101	..	101¼	Mar. '14	101¼ 101¼
Victor Fuel 1st s f 5s	..	84	73	Apr. '14	73 73
Va. I. Coal & Coke 1st g 5s	91	Sale	91	91⅜	90 95

FOREIGN MARKETS

GREAT BRITAIN

May 22—The market has an improving tendency especially for June loading. Quotations are approximately as follow:

Best Welsh steam	$4.68	Best Monmouthshires	$4.14
Best seconds	4.44	Seconds	3.96
Seconds	4.20	Best Cardiff smalls	2.58
Best dry coals	4.20	Seconds	2.46

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are net f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

Coke is quoted at: Special foundry, $6.24; good foundry, $4.80@5.52; furnace, $4.08@4.56.

British Exports—The following is a comparative statement of British exports for April and the four months of the last two years, in long tons:

	April		4 Months	
	1913	1914	1913	1914
Anthracite	235,650	178,704	937,166	900,691
Steam	4,708,475	3,837,620	17,317,543	16,550,502
Gas	983,697	878,877	3,593,943	3,650,074
Household	146,273	82,798	581,727	460,047
Other sorts	276,774	236,019	1,159,499	1,083,073
Total	6,350,869	5,214,018	23,589,878	22,644,387
Coke	70,200	67,615	352,390	369,364
Manufactured fuel	184,145	164,095	691,347	666,276
Grand total	6,605,214	5,445,729	24,633,615	23,680,027
Bunker coal	1,795,946	1,624,282	6,747,177	6,659,730